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TECHNICAL MEMORANDUM 2

ADDENDUM TO FINAL PHASE II RFI/RI WORK PLANS (ALLUVIAL AND BEDROCK)

CHEMICAL ANALYSIS PLAN

REVISION 2

ROCKY FLATS PLANT

903 PAD, MOUND AND EAST TRENCHES AREA

(OPERABLE UNIT NO 2)

U S DEPARTMENT OF ENERGY
Rocky Flats Plant
Golden Colorado

ENVIRONMENTAL RESTORATION PROGRAM

September 1991

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TECHNICAL MEMORANDUM 2

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FINAL PHASE II RFI/RI WORK PLANS
(ALLUVIAL AND BEDROCK)

CHEMICAL ANALYSIS PLAN

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ENVIRONMENTAL RESTORATION PROGRAM

REVIEWED FOR CLASSIFICATION/UCNI
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SEPTEMBER 1991

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GLOSSARY OF ACRONYMS

Acronym	Meaning
ARAR	Applicable or Relevant Appropriate Requirement
CDH	Colorado Department of Health
CERCLA	Comprehensive Environmental Response Compensation and Liability Act of 1980
CLP	Contract Laboratory Program
CRQL	Contract Required Quantitation Limit
ER	Environmental Restoration
ft	feet
GRAASP	General Radiochemistry and Analytical Services Protocol
Hg	Mercury
IHSS	Individual Hazardous Substance Site
kg	kilogram
ℓ	liter
MCL	Maximum Contaminant Level
mg	milligram
mm	millimeter
PCB	Polycholrinated Biphenyl
PNA	Polynuclear Aromatic Hydrocarbon
QAPjP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act of 1976
Rd	Retardation Factor
RFEDS	Rocky Flats Environmental Database System
RFI/RI	RCRA Facility Investigation/CERCLA Remedial Investigation
SDWA	Safe Dnnking Water Act
SID	South Interceptor Ditch
TCL	Target Compound List
μg	microgram
VOC	Volatile Organic Compound
yr	year

TECHNICAL MEMORANDUM 2
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FINAL PHASE II RFI/RI WORK PLANS
(ALLUVIAL AND BEDROCK)
CHEMICAL ANALYSIS PLAN
903 PAD MOUND AND EAST TRENCHES AREAS
(OPERABLE UNIT NO 2)

This document provides analysis and rationale for amending the analytical strategy for the Resource Conservation and Recovery Act (RCRA) Facility Investigation/Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Remedial Investigation (RFI/RI) (Alluvial and Bedrock) at Operable Unit No 2 (OU2) The RFI/RI Work Plans stipulates that soils sediments ground water and surface water be analyzed for all Contract Laboratory Program (CLP) Target Compound List (TCL) organic constituents This analytical program is conservative for various reasons discussed herein however considering that the RFI/RI for OU2 is in its second phase it appears that the need for such a comprehensive analytical program should be reevaluated This document presents a historical review of how the analyte lists evolved as well as an analysis of available sampling results from OU2 as justification for eliminating certain analytical suites from the overall program The basis for developing a site-specific target analyte list is discussed in U S Environmental Protection Agency (EPA) guidance documents for conducting remedial investigations and feasibility studies (EPA 1988) and for developing data quality objectives for remedial response activities (EPA 1989) As discussed with EPA and the Colorado Department of Health (CDH) in a meeting on 17 May 1991 the approach is applicable to establishing the analytical strategy for the upcoming OU2 RFI/RI

BACKGROUND

Comprehensive site characterization began at OU2 in 1986 and a Phase I RI report for OU2 was submitted in December 1987 Site characterization for this previous RI was based on analysis of soils sediments ground water and surface water for the CLP Hazardous Substance List (HSL) compounds (Currently this list of analytes is known as the TCL however it should be noted that there are minor differences in the two lists) Phase II RFI/RI Work Plans for the alluvial and bedrock hydrogeologic systems have been prepared for OU2 which are designed to fill data gaps that were identified in the earlier phase of investigation

The OU2 RFI/RI Work Plans specify analysis of soils sediments ground water and surface water for all TCL organic compounds Analysis for the full suite of TCL organics for ground water and surface water beyond the first round of samples would be dependent on the initial results The need for continued full suite analysis would be based on an assessment approach not unlike that presented in this document The TCL was chosen as the basis for characterizing this OU because it is used by EPA in characterizing uncontrolled hazardous waste sites where historical waste disposal practices are often unknown and because of the associated high quality assurance/quality control procedures that are widely accepted by both federal and state agencies Although chlorinated solvents (and radionuclides) are the principal contaminants at this OU based on historical waste disposal records and previously collected data a list of all chemicals disposed at this location is not known which established the need for monitoring for a more comprehensive list of analytes

With respect to soils the full suite of TCL organics was specified because the upcoming phase of investigation is designed to provide a comprehensive characterization eliminating the need for subsequent phases of investigation More specifically semivolatiles and pesticides/polychlorinated biphenyls (PCBs) were to be analyzed at OU2 because previously collected data indicated the consistent occurrence of phthalate esters and the infrequent occurrence of other semivolatile compounds and pesticides/PCBs Also several proposed waste investigation boreholes will penetrate waste sources (Individual Hazardous Substance Sites [IHSSs]) where previous targeted soil sampling was outside the waste source boundaries Thus the full suite of TCL organics is currently specified because of the uncertainty of the types of waste that were disposed at these OU2 IHSSs

Ground water and surface water were to be analyzed for the full suite of TCL organics because of the infrequent occurrence of semivolatiles and pesticides/PCBs as indicated by previously collected data and the limited quantity of historical data for these classes of chemicals (one to two rounds) Sediments were also to be analyzed for the full suite of TCL organics largely because of it s relevance to contaminant migration in surface water

APPROACH

The approach to defining a site-specific target analyte list consists of the following two steps

Step 1 Summarize Existing Analytical Data by Analytical Suite

In step 1 existing data are tabularized showing the total number of analyses for each chemical within an analytical suite and the total number of detections of each chemical This is performed for each medium that was characterized Seven analytical suites within three major chemical groupings based on analytical protocol can be identified The analytical suites are as follows

Group A Compounds TCL Volatiles

I Ketones and Aldehydes
II Monocyclic Aromatics
III Chlorinated Aliphatics

Group B Compounds TCL Semivolatiles

IV Acid Extractables
V Base Neutral Extractables

Group C Compounds Pesticides/PCBs

VI Pesticides
VII PCBs

This exercise yields one of three possible outcomes

1) **Case 1** Chemicals within one or more analytical suites in a specified media have not been detected above the Contract Required Quantitation Limit (CRQL)

2) **Case 2** One or more chemicals from an analytical suite have been detected in a specified media either inconsistently or at low concentrations

3) **Case 3** Consistent detections of one or more chemicals from an analytical suite in a specified media

Step 2 Evaluation of Results

Each of the cases identified above have implications with regard to the elimination of an analytical suite from the analytical program In Case 1 a strong case can be made to eliminate the analytical suite provided the historical data are of adequate quality or useability and are representative of the site Data quality is assessed in accordance with the Environmental Restoration (ER) Program Quality Assurance Project Plan (QAPjP) and the General Radiochemistry and Analytical Services Protocol (GRAASP) and references therein Evaluation of representativeness must include spatial considerations For example if the chemicals within one or more analytical suites were not detected at a specified sample location it is necessary to be sure associated potential waste sources were investigated Elimination of a suite of chemicals where historical data fit Case 2 requires an assessment of data quality spatial representativeness temporal considerations (depending on the concentrations observed) chemical fate and transport and human risks posed by the chemicals For Case 3 continued monitoring for the analytical suite(s) in order to better characterize the medium is justified particularly if the chemicals are mobile and toxic

Assessment of chemical fate and transport and human/environmental risks is one of determining whether the chemical is at a concentration in a specific medium that poses an unacceptable risk to humans or the environment through a likely exposure pathway and whether the chemical can migrate to another medium at concentrations that also pose an unacceptable risk

Fate and Transport

Table 1 presents some of the relevant chemical/physical parameters that relate to the environmental fate and transport of representative chemicals from each of the analytical suites previously identified The general tendency for chemicals from each group to migrate from one environmental medium to another is discussed below This is summarized in Table 2

Group A Compounds TCL Volatile Organic Compounds

Generally TCL volatile organic compounds (VOCs) have computed mobility indices that suggest high mobility in the environment They are characterized by relatively high water solubility (greater that 100 milligrams per liter [mg/ℓ]) and volatility (vapor pressures generally much greater than 1 millimeter (mm) mercury (Hg) and Henry s Law Constants greater than 0 1) Volatiles can be expected to migrate through soils and to be transported by ground water and surface water as neutral solutes This is denoted by the saturated zone retardation factors (Rds) generally between 1 and 50 (Note chemical migration velocity = water migration velocity/Rd) The substantial vapor pressures and Henry s Law Constants suggest a tendency to volatilize from aqueous systems (including soil water) to the atmosphere

Group B and C Compounds Semivolatiles and Pesticides/PCBs

In general semivolatiles and pesticides/PCBs are considered to be slightly to very immobile (pesticides and PCBs are particularly immobile) Again this is denoted by the high Rds Phenols are the most mobile of these compounds owing to their high water solubility Semivolatiles and pesticides/PCBs exhibit low to negligible volatility as indicated by the very low vapor pressures and Henry s Law Constants This suggests a low propensity for volatilization of these compounds to the atmosphere from soil and soil water

Toxicity

Without the benefit of a risk assessment it is necessary to rely on published acceptable concentrations for chemicals to estimate the risk posed by the various chemicals in each of the media they are found Many of these published standards are considered Applicable or Relevant and Appropriate Requirements (ARARs) In this analysis Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) (an ARAR) and Action Levels under EPA s proposed RCRA Corrective Action Regulations (FR v 55 No 145 July 27 1990 40 CFR 264 521) are used to provide an estimate of concentrations of chemicals that are protective of human health The Action Levels are based on likely chemical exposure scenarios a 10^{-6} incremental cancer risk (for carcinogens) or a no adverse health effect from a lifetime of exposure to a systemic contaminant (non carcinogen) MCLs and Action Levels used in this assessment are shown in Table 3

FINDINGS

Data Considered in This Evaluation

Data from OU2 contained in the Rocky Flats Environmental Database System (RFEDS) were used to perform this evaluation Data from the boreholes ground water wells surface water stations and sediment stations listed in Table 4 and shown in Figures 1 and 2 have been summarized in this document This includes all existing soil/sediment data and surface water and ground water data collected through March of 1991 Table 5 identifies the boreholes in the proximity of each IHSS Table 6 lists ground water monitoring wells and surface water stations that may be impacted by each IHSS

Data Quality, Useability, and Representativeness

With the exception of the cases discussed below soil and water quality data are either valid or acceptable with qualifications based on limited data validation conducted in accordance with guidance provided in the ER QAPjP and GRAASP With respect to both soils and ground water high concentrations of acetone butanone and methylene chloride in the laboratory blanks for the 1986 and 1987 investigations render it difficult to ascertain their presence in samples as an indication of site contamination Furthermore volatile organic data for soils was rejected principally because of the high dilutions used (high detection limits) Since the 1986 and 1987 investigations the sample collection methodology for VOCs in soils has been significantly improved to prevent volatile release during sample handling Therefore these soil data have little or no useability In contrast semivolatile and pesticide/PCB analyses of soils are valid or acceptable with qualifications based on the limited data validation

With respect to representativeness the previous results are from boreholes ground water monitor wells and surface water/sediment stations that span the entire OU However boreholes at OU2 did not penetrate all the IHSSs Therefore previous soil data cannot always be considered representative of buried wastes characteristics for all IHSSs Also ground water and surface water semivolatile and pesticide/PCB data are based on limited rounds of sampling The impact of these observations are discussed in the following section

Results

Table 7 provides a tabulation of the total number of analyses for each analytical suite and the number of occurrences for which a chemical was detected A detection is defined as all reported concentrations of a chemical above the CRQL, and chemical concentrations estimated below the detection limit ("J qualifier) As indicated in Table 7 and discussed further in subsequent sections VOCs are a class of contaminants that are pervasive in all environmental media at OU2 VOCs represent the Case 3 scenario In contrast the other analytical suites occur much less frequently (Case 2) and are the primary subject of this technical memorandum Table 8 9 and 10 summarize by IHSS the occurrence of these non volatile organics

Ground Water and Surface Water

Volatile Organic Compounds

As shown in Tables 11 12 and 13 VOCs are frequently detected and in significant concentrations The chlorinated aliphatics occur often and occasionally at high concentrations These compounds are known waste constituents and are relatively toxic Acetone and to a lesser extent other ketones also appear in the samples However the occurrence of acetone and 2 butanone in a sample is often due to laboratory contamination and there are no occurrences of acetone or 2 butanone above their action levels Concentrations of these ketones are generally two orders of magnitude less than the action level Based on the high health based reference concentrations (action levels) of acetone and 2 butanone it can be surmised that ketones are relatively non toxic and the less frequent occurrence of other ketones at low concentrations is of little concern Therefore ketones could be eliminated from future analysis at OU2 However there is little advantage in removing the ketones from the TCL volatile suite and therefore ground water and surface water samples will be analyzed for all TCL VOCs As a class the VOCs represent Case 3

Semivolatiles (acid extractables)

As shown in Tables 14 15 and 16 out of 93 analyses for acid extractables in ground and surface water there have been a total of nine detections of 2 methylphenol benzoic acid benzyl alcohol pentachlorophenol and phenol within this analytical suite Acid extractables were not detected in bedrock ground water Two of the four detections of phenol are at concentrations of 13 micrograms per liter ($\mu g/\ell$) and 15 $\mu g/\ell$ and occurred at station SW 27 and Pond C-2 respectively (Table 17) The other two detections of phenol are for Pond C 2 but occurred at estimated concentrations (2J $\mu g/\ell$ and 9J $\mu g/\ell$) below the detection limit The action level for phenol in water is 20 000 $\mu g/\ell$ Although phenol occurred in the sediments at SED030 (650J μg/kilogram [kg]) (See Table 28) immediately upstream of SW 27 it did not occur in sediments in the associated sediment station (SED025) nor did it occur in surface water immediately upstream or in soils or ground water anywhere within OU2 The occurrences of phenol at stations SW 27 and Pond C-2 are at low concentrations and were not detected in three other samplings of water at station SW 27 or in ten other sampling events at Pond C 2 The occurrence of 2 methylphenol (24 $\mu g/\ell$) and benzoic acid (8J $\mu g/\ell$) at station SW 27 were at low concentrations and not detected in three other subsequent water sampling events at the station (Table 17) Benzoic acid was detected once at station SW-64 (8J $\mu g/\ell$) at an estimated concentration below the detection limit and did not occur in sediments soils or ground water anywhere within OU2 Similar to benzoic acid benzyl alcohol occurred once at station SW-65 (4J $\mu g/\ell$) and was not detected in two other water sampling events at this station or in any other medium at OU2 The only detection of an acid extractable compound in ground water is pentachlorophenol (4J $\mu g/\ell$) at well 39-86 approximately 3 000 feet northeast of the East Trenches Area Although pentachlorophenol was detected in the soils (at the bedrock contact and water table in boreholes BH4787 and BH5487 respectively) (See Table 30) it was not detected in ground water immediately downgradient (well 41-86) Furthermore the pentachlorophenol Rd (Table 1) together with the average seepage velocity of 82 feet per year (ft/yr) suggests the compound would have migrated less than 1 foot from this location during the past 30 years This suggests the datum for well 39-86 is spurious Regardless the health based reference concentration for pentachlorophenol is 1 000 $\mu g/\ell$

Although acid extractables in ground and surface waters may have arisen from Trenches T 5 through T-8 (Table 8) based on hydraulic gradients and topographic grades respectively the above stated arguments and the fact that there is no history of disposal of wastes containing acid extractable compounds strongly justifies elimination of this analytical suite from future water monitoring at OU2 However source characterization monitor wells will be sampled and analyzed for acid extractables to unambiguously determine whether constituents from this analytical suite are present in the ground water near the waste sources

Semivolatiles (base neutral extractables)

As shown in Tables 18 19 and 20 base/neutral extractables rarely occur in water at OU2 The most frequently occurring compounds are phthalate esters particularly bis(2-ethylhexyl) phthalate and di n buthyl phthalate at estimated concentrations below the detection limit and near the action level of 3 $\mu g/\ell$ However bis(2 ethylhexyl) phthalate did occur at 220 $\mu g/\ell$ at SW 27 but is considered an outlier relative to the concentrations observed elsewhere and the fact that it was not detected at this station during three other samplings Phthalate esters are common laboratory contaminants and bis(2-ethylhexyl)phthalate and di n butyl phthalate often occurred in laboratory blanks for the samples where this compound was detected ("B qualifier)

N nitrosodiphenylamine occurred second most frequently however this compound is also a known laboratory contaminant that leaches from the gas chromatograph column (Note the compound occurred in the laboratory blank in more than half the samples) This compound did occur at 200 $\mu g/\ell$ in Pond C-2 but is also considered an outlier relative to other concentrations observed and the fact that it was not detected in 22 other samplings at this station The remaining detections of N nitrosodiphenylamine are near the health based reference concentration (7 $\mu g/\ell$) and are at estimated concentrations below the detection limit and/or also occurred in the laboratory blank

The remaining few base neutral extractable compounds that were detected are polynuclear aromatic hydrocarbons (PNAs) and all occurred at surface water station SW 101 and Pond C-2 (Table 21) PNA s were not present elsewhere in surface waters at OU2 and are not considered site contaminants originating from historical waste disposal activities at OU2 (see discussion for semivolatiles in soils/sediments) Their infrequent presence in two different drainages also suggest an IHSS is not the sources for PNAs These compounds all occurred at estimated concentrations less than or equal to 4 $\mu g/\ell$ It is noted that the source of immobile contaminants (base neutral extractables and pesticides/PCBs) at SW 101 cannot be IHSSs associated with OU2 because those IHSSs are isolated from the South Walnut Creek drainage above Pond B-4 by the Central Avenue Ditch These contaminants do not migrate readily in ground water

In general none of the base neutral extractable compounds would be considered contaminants of concern from a human health risk assessment perspective owing to either their infrequent occurrence low concentrations (estimated below detection limits) likelihood as a laboratory contaminant or general absence in soils and sediments On this basis further analysis for base neutral extractable compounds in surface water or ground water is not warranted However source characterization monitor wells will be sampled and analyzed for base neutral extractables to unambiguously determine whether constituents from this analytical suite are present in the ground water near the waste sources

Pesticides/PCBs

As shown in Tables 22 23 and 24 pesticide/PCBs occurrences in surface water are rare and none of these compounds have been detected in ground water Atrazine and simazine are two herbicides that were detected in surface water (Table 25) (For convenience herbicides that have been analyzed at the RFP are included in the pesticide/PCB group Observed concentrations are less than 3 $\mu g/\ell$ which is the MCL for atrazine (Table 3) These compounds are not known to be associated with waste disposal at OU2 but rather their occurrence in surface water reflects their probable use at the RFP in weed control AROCLOR 1254 is the only PCB that occurred in surface water It was present at SW-60 at a concentration of 0 15 $\mu g/\ell$ and was not detected in three other samplings at this location (Table 25) As discussed for the base neutral extractables AROCHLOR 1254 at SW-60 could not have arisen from OU2 because OU2 is isolated from South Walnut Creek by the Central Avenue Ditch Because there is no record of disposal of pesticides or PCBs at OU2 and they did not occur in ground or surface water (attributable to OU2) the elimination of pesticide/PCB analysis from future ground water and surface water monitoring at OU2 is justified However source characterization monitor wells will be sampled and analyzed for pesticides/PCBs to unambiguously determine whether constituents from this analytical suite are present in the ground water near the waste sources Herbicides will be monitored in surface water via other RFP programs as appropriate

Soils and Sediments

Volatile Organic Compounds

As shown in Tables 26 and 27 like ground water and surface water chlorinated aliphatics occur in soils and sediments with high frequency and at high concentrations These compounds are known waste constituents that are both toxic and mobile in the environment These constituents should continue to be analyzed Although the monocyclic aromatics and the ketones appear to occur at concentrations far below their acceptable concentrations the actual concentrations in soils within IHSSs is not known As previously discussed this is because the sampling technique for VOCs in soils was inadequate Elimination of monocyclic aromatics and ketones cannot be justified because the soil/sediment RI data is of little useability as a result of the sample collection issue Therefore the full suite of TCL volatiles will be analyzed for these media during the Phase II investigation

Semivolatiles (acid extractables)

Out of 198 analyses for acid extractables there are only three detections of chemicals in this class for soils/sediments at OU2 (Tables 28 29 and 30) Pentachlorophenol was detected at estimated concentrations below the detection limit (95J $\mu g/\ell$ and 41J $\mu g/\ell$ respectively) at boreholes BH4787 and BH5487 This compound was not detected in surface water and was detected at only a very low concentration in ground water at a downgradient well remote from these boreholes If this compound is truly a contaminant it is at concentrations in soils far below the health based reference concentration and is not migrating into water at concentrations that would present an unacceptable human health risk The phenol detected at SED030 (650J $\mu g/\ell$) is far below the health based reference concentration and if it is a contaminant it is also not migrating into surface water at levels that would pose an unacceptable human health risk Also SED-30 is within the Woman Creek drainage south of the South Interceptor Ditch (SID) and is thus isolated from the OU2 IHSSs with respect to runoff

Although the above argument justify elimination of this analytical suite from future waste source analysis many waste source boreholes have been proposed in IHSSs because previous drilling did not penetrate these waste sources (Table 31) Therefore these IHSSs are not chemically characterized and these waste source borehole samples will be analyzed for all TCL organics For completeness all other borehole samples will also be analyzed for all TCL organics Sediments will only be analyzed for TCL volatiles

Semivolatiles (base neutral extractables)

There are frequent occurrences of base neutral extractables in soils/sediments at OU2 (Tables 32 and 33) However phthalate esters represent the majority of these occurrences and were present in soils throughout OU2 The presence of phthalate esters in samples is surmised to be due to field contamination from handling the samples with plastic gloves Regardless the concentrations of the phthalate esters are far below the health based reference concentration for bis(2 ethylhexyl) phthalate (assumed to be representative of the class) Also phthalates are extremely immobile in the environment This is demonstrated by the site data that show the relatively infrequent occurrence of phthalates in water at OU2 N nitrodiphenylamine is the next most frequently occurring base neutral extractable However as discussed for surface water this is considered a laboratory contaminant (occurs at estimated concentrations and is often present in the associated laboratory blanks) and also occurs at concentrations far below the health based reference concentration PNAs comprise the remainder of the occurrences of base neutral extractables in soils/sediments (Table 34) The PNAs occurred in only two soil samples at OU2 These samples are the 0 5 foot composites for boreholes BH3687 and BH3787 Concentrations were low occurring at estimated values below the detection limit These boreholes are associated with the Mound Site (Table 9) where waste burning (a source for PNAs) is not known to have occurred Because the PNAs occur in the composite sample from boreholes that includes the surface PNAs are not likely associated with past disposal of waste at OU2 It appears that the occurrence of PNAs is a result of deposition in the environment from other sources e g burning of fossil fuels fires etc PNAs are also immobile in the environment which is supported by the OU 2 water quality data The low concentration of PNAs occurring at SED 12 could not have arisen from OU2 IHSSs because the IHSSs are separated from SED 12 by the Central Avenue Ditch In spite of these arguments all borehole samples at OU2 will be analyzed for base neutral extractables as discussed under acid extractables Sediment samples will be analyzed for TCL volatiles only

Pesticides/PCBs

Out of 203 analyses for pesticides/PCBs there are only two occurrences of PCBs and one occurrence of pesticides in soils/sediments at OU2 (Tables 35 36 and 37) AROCHLOR 1254 occurred in one soil sample (21J μg/kg) at the Mound Site (Table 9) at an estimated value below the detection limit The concentration below the action level of 90 μg/kg AROCLOR 1254 occurred at 540 μg/kg at SED011 along with 4 4 DDT (95 μg/kg) As previously discussed SED 11 is in the upper reach of South Walnut Creek which is isolated from surface water runoff from OU2 Because pesticides/PCBs are relatively immobile in ground water these contaminants did not arise from OU2 Nevertheless all boreholes at OU2 will be analyzed for pesticides/PCBs as previously discussed Sediment stations will be analyzed for TCL volatiles only

CONCLUSIONS

The conclusions presented above that delineate retaining or deleting analytical suites from future monitoring of environmental media at OU2 are summarized in Table 38 and schematically presented in Figures 2 and 3 Elimination of certain analytical suites from future monitoring/characterization of the various media at this OU is well justified and will not compromise achieving the objectives of the Phase II RFI/RI The future investigation activities will provide better characterization of the extent of contamination for those contaminants that are significant from a waste disposal and human health risk perspective However to better assure the Phase II RFI/RI draws definitive conclusions regarding the nature and extent of contamination at OU2 waste characterization within IHSSs at OU2 and sample analysis for source characterization monitor wells will include the full suite of TCL organics Further if semivolatiles or pesticides/PCBs are detected in these media at significant levels ground water wells surface water and sediment stations in the proximity of these IHSSs will be sampled and analyzed for these compounds at a later date but prior to submittal of the Phase II RFI/RI report

Lastly because CLP gas chromatograph/mass spectrometer (GC/MS) detection limits do not achieve risk based detection limits for some of the carcinogenic chlorinated solvents EPA Method 502 2 which has detection limits as low as 0 5 $\mu g/\ell$ will be used for ground water samples that are collected from wells near the edge of the plume (Table 39) This will allow achieving data quality objections for the RFI/RI All proposed 1991 wells (alluvial and bedrock) are being installed to better define the plume of organic contamination and therefore samples from these wells will be analyzed for volatiles using this method Samples from existing wells and surface water stations remote from the IHSSs as identified on Figures 2 and 3 will also be analyzed for volatiles using this method

TABLE 1

CHEMICAL/PHYSICAL PARAMETERS AFFECTING
ENVIRONMENTAL FATE AND TRANSPORT
(See Notes)

Group A Compounds TCL Volatile Organics

I Ketones & Aldehydes

Chemical	Molecular Weight g/mole	Specific Gravity g/cc	Vapor Pressure mmHg	H Dimension less	Water Solubility mg/l	Log Kow c/c	Log Koc ml/g	Saturated Zone Rd	Mobility Index MI	Env Mobility
Acetone	55 1	0 1	270 00	0 013	60000 0	0 24	0 43	1 0	8	Extremely Mobile

II Monocyclic Aromatics

Chemical	Molecular Weight g/mole	Specific Gravity g/cc	Vapor Pressure mmHg	H Dimension less	Water Solubility mg/l	Log Kow c/c	Log Koc ml/g	Saturated Zone Rd	Mobility Index MI	Env Mobility
Benzene	78 1	0 9	76 00	0 182	1780 0	2 13	1 81	6 8	3	Very Mobile
Toluene	92 1	0 9	22 00	0 214	515 0	2 79	2 48	28 0	2	Very Mobile
Ethyl Benzene	106 2	0 9	7	0 266	152 0	3 34	3 04	100 0	0	Slightly Mobile
Xylene	106 2	0 9	10	0 380	152 0	3 13	2 11	12 6	1	Very Mobile

III Chlorinated Aliphatics

Chemical	Molecular Weight g/mole	Specific Gravity g/cc	Vapor Pressure mmHg	H Dimension less	Water Solubility mg/l	Log Kow c/c	Log Koc ml/g	Saturated Zone Rd	Mobility Index MI	Env Mobility
Carbon Tetrachloride	153 8	1 6	90 00	0 960	785 0	2 96	2 64	40 5	2	Very Mobile
Trichloroethene	131 4	1 5	60 00	0 390	1100 0	2 42	2 10	12 3	3	Very Mobile
Chloroform	119 4	1 5	160 00	0 130	8000 0	1 97	1 64	4 9	4	Very Mobile
1 1 2 2 Trichloroethane	167 9	1 6	5 00	0 016	2900 0	2 39	2 07	11 6	2	Very Mobile

Group B Compunds Semi Volatile Organics

IV Acid Extractables (Phenolics)

Chemical	Molecular Weight g/mole	Specific Gravity g/cc	Vapor Pressure mmHg	H Dimension less	Water Solubility mg/l	Log Kow c/c	Log Koc ml/g	Saturated Zone Rd	Mobility Index MI	Env Mobility
Phenol	94 1	1 1	0 20	1 2E 04	8200 0	1 46	1 15	2 3	2	Very Mobile
Pentachlorophenol	266 4	2 0	1 1E 04	1 1E 04	14 0	5 18	4 72	4771 3	8	Immobile
2 4 Dinitrophenol	184 1	1 7	1 5E 05	2 7E 08	5600 0	1 54	1 22	2 5	2	Slightly Immobile
2 4 6 Trichlorophenol	197 5	1 5	0 012	1 6E 04	800 0	3 61	3 30	181 0	2	Slightly Immobile

V Base Neutral Extractables

Chemical	Molecular Weight g/mole	Specific Gravity g/cc	Vapor Pressure mmHg	H Dimension-less	Water Solubility mg/l	Log Kow c/c	Log Koc ml/g	Saturated Zone Rd	Mobility Index MI	Env Mobility
Bis(2 ethylhexyl)phthalate	391 1	1 0	2 7E 07	4 4E 06	1 3	9 61	9 30	1 8E+08	16	Very Immobile
Chrysene	228 2	1 3	1 0E 11	6 9E 08	0 0	5 61	5 30	1 8E+04	19	Very Immobile
1 2 4 Trichlorobenzene	181 5	1 5	0 29	9 6E 02	30	4 28	3 96	8 3E+02	3	Slightly Immobile
1 3 Dichlorobenzene	147 0	1 3	2 28	1 5E 01	123	4 28	3 96	8 3E+02	2	Slightly Immobile
Naphthalene	128 2	1 0	0 087	1 9E 02	31 7	3 29	2 97	8 6E+01	3	Slightly Immobile
Benzo(a)pyrene	252 0	1 4	5 6E 09	2 0E 05	3 8E 03	6 06	6 74	5 0E+05	17	Very Immobile

Group C Compounds PCB s and Pesticides

VI PCB s

Chemical	Molecular Weight g/mole	Specific Gravity g/cc	Vapor Pressure mmHg	H Dimension less	Water Solubility mg/l	Log Kow c/c	Log Koc ml/g	Saturated Zone Rd	Mobility Index MI	Env Mobility
PCB 1248	299 5	1 4	4 9E 04	1 5E 01	0 054	5 76	5 44	24931 0	10	Immobile
PCB 1254	328 4	1 5	7 7E 05	4 6E 02	0 0	6 03	5 72	47233 7	11	Very Immobile
PCB 1260	375 7	1 6	4 1E 05	2 8E 01	0 0	7 15	6 82	594625 1	14	Very Immobile

VII Chlorinated Pesticides

Chemical	Molecular Weight g/mole	Specific Gravity g/cc	Vapor Pressure mmHg	H Dimension less	Water Solubility mg/l	Log Kow c/c	Log Koc ml/g	Saturated Zone Rd	Mobility Index MI	Env Mobility
Dieldrin	381 0	1 8	1 8E 07	1 9E 05	0 2	3 54	3 23	153 8	11	Very Immobile
DDT	375 7	1 6	1 9E 07	7 1E 04	5 5E 03	6 91	6 59	350141 6	16	Very Immobile
Heptachlor	375 0	1 6	3 0E 04	3 4E 02	0 18	4 4	4 1	1081 0	8	Immobile
Lindane	291 0	1 6	2 5E 05	2 5E 04	1 6	3 9	3 6	343 0	8	Immobile
Chlordane	409 8	1 6	1 0E 05	4 0E 03	0 056	5 5	5 1	12601 0	11	Very Immobile
Toxaphene	414 0	1 6	0 3	1 4E+01	0 5	3 3	3 0	87 8	4	

TABLE 2

SUMMARY OF ENVIRONMENTAL
INTER MEDIA MIGRATION
CHARACTERISTICS

Inter Media Migration Characteristic	Aldehydes & Ketones	Monocyclic Aromatics	Chlorinated Aliphatics	Acid Extractables	Base Neutral Extractables	PCB s	Pesticides
Soil to Groundwater	Yes	Yes	Yes	Yes	No	No	No
Soil or Soil Water to Air	No	Yes	Yes	No	No	No	No
Migration in Groundwater	Yes	Yes	Yes	Yes	No	No	No

TABLE 3

HEALTH BASED REFERENCE CONTAMINANT CONCENTRATIONS

COMPOUND	MCL (µg/ℓ)	RCRA ACTION LEVEL WATER (µg/ℓ)	RCRA ACTION LEVEL SOIL (µg/kg)
Volatiles			
Benzene	5	N/A	
Ethylbenzene	700	N/A	8 000 000
Toluene	1 000	N/A	20 000 000
Xylene	10 000	N/A	200 000 000
Acetone		4 000	8 000 000
2 Butanone		2 000	4 000 000
Semivolatiles			
Bis(2 ethylhexyl)phthalate		3	50 000
Phenol		20 000	50 000 000
Pentachlorophenol		1 000	2 000 000
N Nitrosodiphenylamine		7	100 000
1 2 4 Trichlorobenzene		700	2 000 000
1 4 Dichlorobenzene	7 5		
PCBs and Pesticides			
PCBs		N/A	90
Atrazine	3 0	N/A	N/A

Atrazine is a herbicide

TABLE 4

EXISTING OU2 BOREHOLES GROUND WATER WELLS SURFACE WATER AND SEDIMENT STATIONS

Boreholes	Alluvial Ground Water Wells	Bedrock Ground Water Wells	Surface Water Stations	Sediment Stations
BH2287	3386	6286	SW026	SD011
BH2387	3986	0386	SW027	SD012
BH2487	4196	0987BR	SW028	SD013
BH2587	4286	1187BR	SW029	SD025
BH2687	4386	1287BR	SW030	SD026
BH2787	1087	1487BR	SW050	SD027
BH2887	1587	2387BR	SW051	SD028
BH2987	1787	3687BR	SW052	SD029
BH3087	1987	3486	SW053	SD030
BH3187	2498	4086	SW054	SD031
BH3287	2687	1687BR	SW055	
BH3387	2787	1887BR	SW057	
BH3487	3287	2087BR	SW058	
BH3587	3387	2287BR	SW062	
BH3687	3587	2887BR	SW063	
BH3787	5087	3087BR	SW064	
BH3887	6386	3187BR	SW070	
BH3987	6786	3487BR	SW077	
BH4087	2987	4587BR	SW021	
BH4187	4487	2587BR	SW022	
BH4287	3586		SW023	
BH4387	3686		SW059	
BH4487	2187		SW060	
BH4587	0171		SW061	
BH4687	0271		SW101	
BH4787	0174		SW065	
BH4887	0374		SW103	
BH4987			SW024	
BH5087			SW025	
BH5187			SW102	
BH5287			SW132	
BH5387			SW133	
BH5487				
BH5587				
BH5687				
BH5787				

TABLE 6

MONITORING WELLS SURFACE WATER AND SEDIMENT STATIONS IMMEDIATELY DOWNGRADIENT OF IHSSs*
Operable Unit No 2

IHSS		GROUND WATER MONITORING WELL	SURFACE WATER/ SEDIMENT STATION
No	Name		
108	Trench T 1	19 87, 20 87, 01 74, 34 86, 35 86	SW 59
109	Trench T 2	02 71, 62 86, 63 86	SW 30/SED 28
110	Trench T 3	03 74, 36 86, 35 87	NA
111 1	Trench T 4	03 74, 35 87, 36 87	NA
111 2	Trench T 5	27 87, 28 87, 07 74, 31 87	SW 65, SW 27/SED 25
111 3	Trench T 6	27 87, 28 87, 07 74, 31 87	SW 65, SW 27/SED 25
111 4	Trench T 7	27 87, 28 87, 07 74, 31 87	SW 65, SW 27/SED 25
111 5	Trench T 8	27 87, 28 87, 07 74, 31 87	SW 65, SW 27/SED 25
111 6	Trench T 9	27 87, 28 87, 07 74, 31 87	SW 65, SW 27/SED 25
111 7	Trench T 10	03 74, 35 87, 36 87	NA
111 8	Trench T 11	03 74, 35 87, 36 87	NA
112	903 Pad Drum Storage Site	43 86 23 87 16 87 15 87 1 71	SW 50 SED 28 SED 29
113	Mound Site	19 87, 01 74, 20 87, 35 86, 34 86	SW 59
140	Reactive Metal Destruction Site	12 87 11 87 02 71	SW 50 SW 52 SW 57 SW 77 SW 55
153	Oil Burn Pit No 2	21 87 22 87	SW 59
154 1	Pallet Burn Site	21 87 22 87	SW 59
154 2	Pallet Burn Site	21 87 22 87	
155	903 Pad Lip Site	02 71 62 86 63 86 12 87 1 71 15 87 16 87 17 87 18 87 43 86 23 87	SW 50 SW 52 SW 57 SW 77 SW 55 SW 51 SW 58
183	Gas Detox ification Site	12 87 11 87 02 71	SW 50 SW 52 SW 57 SW 77 SW 55
216 2 216 3	East Spray Fields	32 87 40 86 41 86	SW 26/SED 24

Monit Well Su ace Wate an Sediment Stations immediately downgradient of IHSSs estimated based on potentiometric su ace and topographic grades

TABLE 7

SUMMARY OF DETECTED COMPOUNDS FOR
Operable Unit No 2

Phase I RIs

Matrix Soil/Sediment

Analytical Suite	Detections( ) / Analyses(2)	Case	Comment
Pesticides/PCBs	3 / 5293	2	No History of Release at the Site
Acid Extractables	3 / 3168	2	No History of Release at the Site
Base Neutral Extractables	336 / 9644	2	Extremely Immobile in Ground Water
Volatile Organic Compounds	5106 / 7534	3	Assumed to be Site Related

Matrix Ground Water/Surface Water

Analytical Suite	Detections( ) / Analyses(2)	Case	Comment
Pesticides/PCBs	10 / 2576	2	No History of Release at the Site
Acid Extractables	9 / 1512	2	No History of Release at the Site
Base Neutral Extractables	82 / 4754	2	Extremely Immobile in Ground Water
Volatile Organic Compounds	465 / 28 576	3	Assumed to be Site Related

( ) Reported concentrations of a chemical above the CRQL including chemical concentrations estimated below the detection limit

(2) The sum of the number of analysis performed for each chemical within an analytical suite

TABLE 11

OU2 SURFACE WATER VOC SUMMARY (µg/ℓ)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL*	Maximum Value	Average Value
1	1 1 1 2 TETRACHLOROETHANE	6	0	0		
2	1 1 1 TRICHLOROETHANE	361	35	5	42	12 171
3	1 1 2 2 TETRACHLOROETHANE	343	3	5	3 J	2 000
4	1 1 2 TRICHLOROETHANE	360	2	5	2 J	1 500
5	1 1 DICHLOROETHANE	344	24	5	8	2 833
6	1 1 1 DICHLOROETHENE	358	24	5	140	26 500
7	1 1 DICHLOROPROPENE	7	0	0		
8	1 2 3 TRICHLOROPROPANE	7	0	0		
9	1 2 DIBROMOETHANE	7	0	0		
10	1 2 DICHLOROETHANE	360	3	5	1 J	1 000
11	1 2 DICHLOROETHENE	350	44	5	360	53 023
12	1 2 DICHLOROPROPANE	343	1	5	1 J	1 000
13	1 2 DIMETHYLBENZENE	68	2	5	1 J	1 000
14	1 3 DICHLOROPROPANE	7	0	0		
15	2 BUTANONE	339	12	10	25	11 750
16	2 CHLOROETHYL VINYL ETHER	68	0	0		
17	2 HEXANONE	336	2	10	1 J	1 000
18	4 METHYL 2 PENTANONE	336	2	10	1 JB	1 000
19	ACETONE	344	106	10	65	7 349
20	BENZENE	340	6	5	42 J	9 000
21	BENZENE 1 2 4 TRIMETHYL	7	0	0		
22	BENZENE 1 3 5 TRIMETHYL	7	0	0		
23	BROMOCHLOROMETHANE	6	0	0		
24	BROMODICHLOROMETHANE	343	8	5	2 J	1 750
25	BROMOFORM	343	0	5		
26	BROMOMETHANE	343	0	10		
27	CARBON DISULFIDE	337	12	5	11	3 417
28	CARBON TETRACHLORIDE	363	84	5	1005	88 024
29	CHLOROBENZENE	340	4	5	7	3 000
30	CHLOROETHANE	343	1	10	2 J	2 000
31	CHLOROFORM	364	89	5	84	17 685
32	CHLOROMETHANE	343	0	10		
33	CUMENE	7	0	0		
34	DIBROMOCHLOROMETHANE	343	0	5		
35	DIBROMOMETHANE	7	0	0		
36	DICHLORODIFLUOROMETHANE	7	0	0		
37	ETHYLBENZENE	343	2	5	1 J	1 000
38	METHYLENE CHLORIDE	358	201	5	68	6 134
39	PROPANE 1 2 DIBROMO 3 CHLOR	7	0	0		
40	STYRENE	343	0	5		
41	TETRACHLOROETHENE	361	80	5	270	30 900
42	TOLUENE	341	18	5	18 J	5 556
43	TOTAL XYLENES	336	5	5	40 J	11 000
44	TRICHLOROETHENE	359	100	5	2000	75 520
45	TRICHLOROFLUOROMETHANE	7	0	0		
46	VINYL ACETATE	336	4	10	2 J	1 250
47	VINYL CHLORIDE	343	20	10	16	5 500

TABLE 11 (Continued)

OU2 SURFACE WATER VOC SUMMARY ($\mu g/\ell$)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL	Maximum Value	Average Value
48	cis 1 2 DICHLOROETHENE	7	0	5		
49	cis 1 3 DICHLOROPROPENE	337	1	5	1 J	1 000
50	n BUTYLBENZENE	7	0	0		
51	n PROPYLBENZENE	7	0	0		
52	o CHLOROTOLUENE	7	0	0		
53	p CHLOROTOLUENE	7	0	0		
54	p CYMENE	7	0	0		
55	p XYLENE	6	0	0		
56	sec BUTYLBENZENE	7	0	0		
57	sec DICHLOROPROPANE	7	0	0		
58	tert BUTYLBENZENE	7	0	0		
59	trans 1 2 DICHLOROETHENE	14	2	5	9	6
60	trans 1 3 DICHLOROPROPENE	337	0	5		
		===	=			
		12 078	897			

Contract Required Quantitation Limit

J Estimated value below the detection limit

TABLE 12

OU2 ALLUVIAL GROUND WATER VOC SUMMARY (µg/ℓ)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL*	Maximum Value	Average Value
1	1 1 1 TRICHLOROETHANE	270	31	5	2892	112 52
2	1 1 2 2 TETRACHLOROETHANE	216	4	5	6	3 75
3	1 1 2 TRICHLOROETHANE	269	6	5	51	13 50
4	1 1 DICHLOROETHANE	217	23	5	62	34 96
5	1 1 DICHLOROETHENE	270	51	5	673	38 86
6	1 2 DICHLOROETHANE	270	9	5	400	101 44
7	1 2 DICHLOROETHENE	255	35	5	1600	116 74
8	1 2 DICHLOROPROPANE	216	1	5	3 J	3 00
9	1 2 DIMETHYLBENZENE	2	0	5		
10	2 BUTANONE	216	5	10	5 BJ	3 60
11	2 CHLOROETHYL VINYL ETHER	80	0	0		
12	2 HEXANONE	216	2	0	47	26 00
13	4 METHYL 2 PENTANONE	216	3	10	35	12 33
14	ACETONE	217	46	10	68	11 57
15	BENZENE	216	3	5	2 J	1 63
16	BROMODICHLOROMETHANE	216	1	5	1 J	1 00
17	BROMOFORM	216	0	5		
18	BROMOMETHANE	216	0	10		
19	CARBON DISULFIDE	216	7	5	4 J	2 57
20	CARBON TETRACHLORIDE	270	89	5	6400 DE	1039 78
21	CHLOROBENZENE	216	0	5		
22	CHLOROETHANE	216	0	10		
23	CHLOROFORM	270	89	5	1525	99 62
24	CHLOROMETHANE	216	0	10		
25	DIBROMOCHLOROMETHANE	216	0	5		
26	ETHYLBENZENE	216	2	5	3 J	3 00
27	METHYLENE CHLORIDE	217	87	5	4100 B	70 37
28	STYRENE	216	1	5	9	9 00
29	TETRACHLOROETHENE	270	133	5	528000	8906 21
30	TOLUENE	216	16	5	12	3 06
31	TOTAL XYLENES	216	3	5	4 J	2 67
32	TRICHLOROETHENE	270	131	5	28800	1731 28
33	VINYL ACETATE	216	0	10		
34	VINYL CHLORIDE	216	15	10	930	402 80
35	cis 1 3 DICHLOROPROPENE	216	0	5		
36	trans 1 2 DICHLOROETHENE	27	7	5	1070	186 00
37	trans 1 3 DICHLOROPROPENE	216	0	5		
		7 926	800			

Contract Required Quantitation Limit

J Estimated value below the detection limit

B Found in laboratory blank

D Dilution factor

E Estimated value

TABLE 13

OU2 BEDROCK GROUND WATER VOC SUMMARY (µg/ℓ)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL	Maximum Value	Average Value
1	1 1 1 TRICHLOROETHANE	268	14	5	1472	186 29
2	1 1 2 2 TETRACHLOROETHANE	242	0	5		
3	1 1 2 TRICHLOROETHANE	268	0	5		
4	1 1 DICHLOROETHANE	242	3	5	6	4 33
5	1 1 DICHLOROETHENE	268	16	5	1044	135 06
6	1 2 DICHLOROETHANE	268	2	5	2 J	2 00
7	1 2 DICHLOROETHENE	262	14	5	92	22 93
8	1 2 DICHLOROPROPANE	242	0	5		
9	1 2 DIMETHYLBENZENE	2	0	5		
10	2 BUTANONE	242	8	10	150 B	24 62
11	2 CHLOROETHYL VINYL ETHER	91	0	0		
12	2 HEXANONE	242	4	10	975	253 00
13	4 METHYL 2 PENTANONE	242	3	10	9 BJ	7 00
14	ACETONE	242	50	10	4100 BJ	97 70
15	BENZENE	242	1	5	1 J	1 00
16	BROMODICHLOROMETHANE	242	1	5	1 J	1 00
17	BROMOFORM	242	0	5		
18	BROMOMETHANE	242	0	10		
19	CARBON DISULFIDE	242	4	5	12	6 75
20	CARBON TETRACHLORIDE	268	56	5	3673	377 68
21	CHLOROBENZENE	242	0	5		
22	CHLOROETHANE	242	0	10		
23	CHLOROFORM	268	62	5	5427	275 13
24	CHLOROMETHANE	242	0	10		
25	DIBROMOCHLOROMETHANE	242	0	5		
26	ETHYLBENZENE	242	1	5	1 BJ	1 00
27	METHYLENE CHLORIDE	242	80	5	1600 B	44 54
28	STYRENE	242	0	5		
29	TETRACHLOROETHENE	268	64	5	4654	217 31
30	TOLUENE	242	14	5	53	8 19
31	TOTAL XYLENES	242	1	5	0 8 J	0 80
32	TRICHLOROETHENE	268	58	5	221860	17810 38
33	VINYL ACETATE	242	0	10		
34	VINYL CHLORIDE	242	0	10		
35	cis 1 3 DICHLOROPROPENE	242	0	5		
36	trans 1 2 DICHLOROETHENE	23	0	5		
37	trans 1 3 DICHLOROPROPENE	242	0	5		
		= ==	=-=			
		8 572	456			

Contract Required Quantitation Limit

J Estimated value below the detection limit

B Found in laboratory blank

TABLE 14

OU2 SURFACE WATER ACID EXTRACTABLE SUMMARY ($\mu g/\ell$)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL	Maximum Value	Average Value
1	1 2 DIPHENYLHYDRAZINE	2	0	0		
2	2 4 5 TRICHLOROPHENOL	84	0	50		
3	2 4 6 TRICHLOROPHENOL	86	0	10		
4	2 4 DICHLOROPHENOL	86	0	10		
5	2 4 DIMETHYLPHENOL	86	0	10		
6	2 4 DINITROPHENOL	86	0	50		
7	2 CHLOROPHENOL	86	0	10		
8	2 METHYLPHENOL	84	1	10	24	24 00
9	2 NITROPHENOL	86	0	10		
10	4 6 DINITRO 2 METHYLPHENOL	86	0	50		
11	4 CHLORO 3 METHYLPHENOL	86	0	10		
12	4 METHYLPHENOL	84	0	10		
13	4 NITROPHENOL	86	0	50		
14	BENZOIC ACID	84	2	50	8 J	8 00
15	BENZYL ALCOHOL	84	1	10	4 J	4 00
16	PENTACHLOROPHENOL	86	0	50		
17	PHENOL	86	4	10	15	9 75
		1368	8			

Contract Required Quantitation Limit

J Estimated value below the detection limit

TABLE 15

OU2 ALLUVIAL GROUND WATER ACID EXTRACTABLE SUMMARY ($\mu g/\ell$)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL	Maximum Value	Average Value
1	2 4 5 TRICHLOROPHENOL	7	0	50		
2	2 4 6 TRICHLOROPHENOL	7	0	10		
3	2 4 DICHLOROPHENOL	7	0	10		
4	2 4 DIMETHYLPHENOL	7	0	10		
5	2 4 DINITROPHENOL	7	0	50		
6	2 CHLOROPHENOL	7	0	10		
7	2 METHYLPHENOL	7	0	10		
8	2 NITROPHENOL	7	0	10		
9	4 6 DINITRO 2 METHYLPHENOL	7	0	50		
10	4 CHLORO 3 METHYLPHENOL	7	0	10		
11	4 METHYLPHENOL	7	0	10		
12	4 NITROPHENOL	7	0	50		
13	BENZOIC ACID	7	0	50		
14	BENZYL ALCOHOL	7	0	10		
15	PENTACHLOROPHENOL	7	1	50	4 J	4
16	PHENOL	7	0	10		
		=== =	== -			
		112	1			

Contract Required Quantitation Limit

J Estimated value below the detection limit

TABLE 16

OU2 BEDROCK GROUND-WATER ACID EXTRACTABLE SUMMARY ($\mu g/\ell$)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL*	Maximum Value	Average Value
1	2 4 5 TRICHLOROPHENOL	2	0	50		
2	2 4 6 TRICHLOROPHENOL	2	0	10		
3	2 4 DICHLOROPHENOL	2	0	10		
4	2 4 DIMETHYLPHENOL	2	0	10		
5	2 4 DINITROPHENOL	2	0	50		
6	2 CHLOROPHENOL	2	0	10		
7	2 METHYLPHENOL	2	0	10		
8	2 NITROPHENOL	2	0	10		
9	4 6 DINITRO 2 METHYLPHENOL	2	0	50		
10	4 CHLORO 3 METHYLPHENOL	2	0	10		
11	4 METHYLPHENOL	2	0	10		
12	4 NITROPHENOL	2	0	50		
13	BENZOIC ACID	2	0	50		
14	BENZYL ALCOHOL	2	0	10		
15	PENTACHLOROPHENOL	2	0	50		
16	PHENOL	2	0	10		
		==	= ==			
		32	0			

Contract Required Quantitation Limit

TABLE 17

OU2 SURFACE WATER ACID EXTRACTABLE SUMMARY BY LOCATION

Location	Sample Number	Analyte	Concentration (µg/ℓ)	Qualifier	Detection Limit	Collection Date
SW027	TRG SW27088600	2 METHYLPHENOL	24		10	
SW027	TRG SW27088600	BENZOIC ACID	8	J	50	
SW027	TRG SW27088600	PHENOL	13		10	
SW064	TRG SW00433WC	BENZOIC ACID	8	J	50	90 10 23
SW064	TRG SW00433WC	BENZYL ALCOHOL	4	J	10	90 10 23
SWC2	TRG SWC20411	PHENOL	9	J	10	89 07 21
SWC2	TRG SWC20503	PHENOL	2	J	10	89 07 21
SWC2	TRG SWC20710002	PHENOL	15		10	89 08 02

J Estimated value below the detection limit

TABLE 18

OU2 SURFACE WATER BASE NEUTRAL EXTRACTABLE SUMMARY (µg/ℓ)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL	Maximum Value	Average Value
1	1 2 3 TRICHLOROBENZENE	7	0	0		
2	1 2 4 TRICHLOROBENZENE	93	0	10		
3	1 2 DICHLOROBENZENE	93	0	10		
4	1 3 DICHLOROBENZENE	93	0	10		
5	1 3 DIMETHYLBENZENE	7	0	0		
6	1 4 DICHLOROBENZENE	93	0	10		
7	2 4 DINITROTOLUENE	86	0	10		
8	2 6 DINITROTOLUENE	86	0	10		
9	2 CHLORONAPHTHALENE	86	0	10		
10	2 METHYLNAPHTHALENE	84	0	10		
11	2 NITROANILINE	84	0	50		
12	3 3 DICHLOROBENZIDINE	86	0	20		
13	3 NITROANILINE	84	0	50		
14	4 BROMOPHENYL PHENYL ETHER	86	0	10		
15	4 CHLOROANILINE	84	0	10		
16	4 CHLOROPHENYL PHENYL ETHER	86	0	10		
17	4 NITROANILINE	84	0	50		
18	ACENAPHTHENE	87	0	10		
19	ACENAPHTHYLENE	87	0	10		
20	ANTHRACENE	87	1	10	2 J	2 000
21	BENZENAMINE	7	0	0		
22	BENZIDINE	10	0	0		
23	BENZO(a)ANTHRACENE	87	2	10	2 J	1 500
24	BENZO(a)PYRENE	87	1	10	3 J	3 000
25	BENZO(b)FLUORANTHENE	87	1	10	3 J	3 000
26	BENZO(ghi)PERYLENE	87	0	10		
27	BENZO(k)FLUORANTHENE	87	1	10	4 J	4 000
28	BIS(2 CHLOROETHOXY)METHANE	86	0	10		
29	BIS(2 CHLOROETHYL)ETHER	86	0	10		
30	BIS(2 CHLOROISOPROPYL)ETHER	86	0	10		
31	BIS(2 ETHYLHEXYL)PHTHALATE	87	28	10	220	10 286
32	BROMOBENZENE	7	0	0		
33	BUTYL BENZYL PHTHALATE	86	2	10	2 J	1 500
34	CHRYSENE	87	2	10	2 J	1 500
35	DI n BUTYL PHTHALATE	87	15	10	17	2 733
36	DI n OCTYL PHTHALATE	86	1	10	2 J	2 000
37	DIBENZO(a h)ANTHRACENE	87	0	10		
38	DIBENZOFURAN	84	0	10		
39	DIETHYL PHTHALATE	86	0	10		
40	DIMETHYL PHTHALATE	86	0	10		
41	FLUORANTHENE	87	1	10	2 J	2 000
42	FLUORENE	87	0	10		
43	HEXACHLOROBENZENE	86	0	10		
44	HEXACHLOROBUTADIENE	93	0	10		
45	HEXACHLOROCYCLOPENTADIENE	86	0	10		
46	HEXACHLOROETHANE	86	0	10		
47	INDENO(1 2 3 cd)PYRENE	87	0	10		
48	ISOPHORONE	86	0	10		
49	N NITROSO DI n PROPYLAMINE	86	0	10		
50	N NITROSODI N BUTYLAMINE	1	0	0		
51	N NITROSODIETHYLAMINE	1	0	0		
52	N NITROSODIMETHYLAMINE	10	0	0		

TABLE 18 (Continued)

OU2 SURFACE WATER BASE NEUTRAL EXTRACTABLE SUMMARY ($\mu g/\ell$)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL	Maximum Value	Average Value
53	N NITROSODIPHENYLAMINE	86	10	10	200	30 1
54	N NITROSOPYRROLIDINE	1	0	0		
55	NAPHTHALENE	94	0	10		
56	NITROBENZENE	86	0	10		
57	PHENANTHRENE	87	0	10		
58	PYRENE	87	1	10	2 J	2 0
		4313	66			

Contract Required Quantitation Limit

J Estimated concentration below the detection limit

TABLE 19

OU2 ALLUVIAL GROUND-WATER BASE NEUTRAL EXTRACTABLE SUMMARY (μg/ℓ)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL	Maximum Value	Average Value
1	1 2 4 TRICHLOROBENZENE	7	0	10		
2	1 2 DICHLOROBENZENE	7	0	10		
3	1 3 DICHLOROBENZENE	7	0	10		
4	1 4 DICHLOROBENZENE	7	0	10		
5	2 4 DINITROTOLUENE	7	0	10		
6	2 6 DINITROTOLUENE	7	0	10		
7	2 CHLORONAPHTHALENE	7	0	10		
8	2 METHYLNAPHTHALENE	7	0	10		
9	2 NITROANILINE	7	0	50		
10	3 3 DICHLOROBENZIDINE	7	0	20		
11	3 NITROANILINE	7	0	50		
12	4 BROMOPHENYL PHENYL ETHER	7	0	10		
13	4 CHLOROANILINE	7	0	10		
14	4 CHLOROPHENYL PHENYL ETHER	7	0	10		
15	4 NITROANILINE	7	0	50		
16	ACENAPHTHENE	7	0	10		
17	ACENAPHTHYLENE	7	0	10		
18	ANTHRACENE	7	0	10		
19	BENZO(a)ANTHRACENE	7	0	10		
20	BENZO(a)PYRENE	7	0	10		
21	BENZO(b)FLUORANTHENE	7	0	10		
22	BENZO(ghi)PERYLENE	7	0	10		
23	BENZO(k)FLUORANTHENE	7	0	10		
24	BIS(2 CHLOROETHOXY)METHANE	7	0	10		
25	BIS(2 CHLOROETHYL)ETHER	7	0	10		
26	BIS(2 CHLOROISOPROPYL)ETHER	7	0	10		
27	BIS(2 ETHYLHEXYL)PHTHALATE	7	3	10	4 JB	2 667
28	BUTYL BENZYL PHTHALATE	7	0	10		
29	CHRYSENE	7	0	10		
30	DI n BUTYL PHTHALATE	7	4	10	21	7 250
31	DI n OCTYL PHTHALATE	7	0	10		
32	DIBENZO(a h)ANTHRACENE	7	0	10		
33	DIBENZOFURAN	7	0	10		
34	DIETHYL PHTHALATE	7	0	10		
35	DIMETHYL PHTHALATE	7	0	10		
36	FLUORANTHENE	7	0	10		
37	FLUORENE	7	0	10		
38	HEXACHLOROBENZENE	7	0	10		
39	HEXACHLOROBUTADIENE	7	0	10		
40	HEXACHLOROCYCLOPENTADIENE	7	0	10		
41	HEXACHLOROETHANE	7	0	10		
42	INDENO(1 2 3 cd)PYRENE	7	0	10		
43	ISOPHORONE	7	0	10		
44	N NITROSO DI n PROPYLAMINE	7	0	10		
45	N NITROSODIPHENYLAMINE	7	5	10	19 B	12 000
46	NAPHTHALENE	7	0	10		
47	NITROBENZENE	7	0	10		
48	PHENANTHRENE	7	0	10		
49	PYRENE	7	0	10		
		= ==	-= ===			
		343	12			

Contract Required Quantitation Limit
J Estimated value below the detection limit
B Found in laboratory blank

TABLE 20

OU2 BEDROCK GROUND-WATER BASE NEUTRAL EXTRACTABLE SUMMARY (μg/ℓ)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL	Maximum Value	Average Value
1	1 2 4 TRICHLOROBENZENE	2	0	10		
2	1 2 DICHLOROBENZENE	2	0	10		
3	1 3 DICHLOROBENZENE	2	0	10		
4	1 4 DICHLOROBENZENE	2	0	10		
5	2 4 DINITROTOLUENE	2	0	10		
6	2 6 DINITROTOLUENE	2	0	10		
7	2 CHLORONAPHTHALENE	2	0	10		
8	2 METHYLNAPHTHALENE	2	0	10		
9	2 NITROANILINE	2	0	50		
10	3 3 DICHLOROBENZIDINE	2	0	20		
11	3 NITROANILINE	2	0	50		
12	4 BROMOPHENYL PHENYL ETHER	2	0	10		
13	4 CHLOROANILINE	2	0	10		
14	4 CHLOROPHENYL PHENYL ETHER	2	0	10		
15	4 NITROANILINE	2	0	50		
16	ACENAPHTHENE	2	0	10		
17	ACENAPHTHYLENE	2	0	10		
18	ANTHRACENE	2	0	10		
19	BENZO(a)ANTHRACENE	2	0	10		
20	BENZO(a)PYRENE	2	0	10		
21	BENZO(b)FLUORANTHENE	2	0	10		
22	BENZO(ghi)PERYLENE	2	0	10		
23	BENZO(k)FLUORANTHENE	2	0	10		
24	BIS(2 CHLOROETHOXY)METHANE	2	0	10		
25	BIS(2 CHLOROETHYL)ETHER	2	0	10		
26	BIS(2 CHLOROISOPROPYL)ETHER	2	0	10		
27	BIS(2 ETHYLHEXYL)PHTHALATE	2	1	10	11 B	11
28	BUTYL BENZYL PHTHALATE	2	0	10		
29	CHRYSENE	2	0	10		
30	DI n BUTYL PHTHALATE	2	1	10	4 JB	4
31	DI n OCTYL PHTHALATE	2	0	10		
32	DIBENZO(a h)ANTHRACENE	2	0	10		
33	DIBENZOFURAN	2	0	10		
34	DIETHYL PHTHALATE	2	0	10		
35	DIMETHYL PHTHALATE	2	0	10		
36	FLUORANTHENE	2	0	10		
37	FLUORENE	2	0	10		
38	HEXACHLOROBENZENE	2	0	10		
39	HEXACHLOROBUTADIENE	2	0	10		
40	HEXACHLOROCYCLOPENTADIENE	2	0	10		
41	HEXACHLOROETHANE	2	0	10		
42	INDENO(1 2 3 cd)PYRENE	2	0	10		
43	ISOPHORONE	2	0	10		
44	N NITROSO DI n PROPYLAMINE	2	0	10		
45	N NITROSODIPHENYLAMINE	2	2	10	7 JB	5
46	NAPHTHALENE	2	0	10		
47	NITROBENZENE	2	0	10		
48	PHENANTHRENE	2	0	10		
49	PYRENE	2	0	10		
		98	4			

Contact Required Quantitation Limit
B Found In Laboratory Blank
J Estimated value below the detection limit

TABLE 21

OU2 SURFACE WATER PNA SUMMARY BY LOCATION

Location	Sample Number	Analyte	Concentration ($\mu g/\ell$)	Qualifier	Detection Limit	Collection Date
SW101	TRG SW101002	ANTHRACENE	2	J	10	89 05 11
SW101	TRG SW101002	BENZO(a)ANTHRACENE	1	J	10	89 05 11
SW101	TRG SW101002	CHRYSENE	1	J	10	89 05 11
SW101	TRG SW101002	FLUORANTHENE	2	J	10	89 05 11
SW101	TRG SW101002	PYRENE	2	J	10	89 05 11
SWC2	TRG SWC208860	BENZO(a)ANTHRACENE	2	J	10	
SWC2	TRG SWC208860	BENZO(a)PYRENE	3	J	10	
SWC2	TRG SWC208860	BENZO(b)FLUORANTHENE	3	J	10	
SWC2	TRG SWC208860	BENZO(k)FLUORANTHENE	4	J	10	
SWC2	TRG SWC208860	CHRYSENE	2	J	10	

TABLE 22

OU2 SURFACE WATER PESTICIDE/PCB SUMMARY** (µg/ℓ)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL*	Maximum Value	Average Value
1	2 2 DICHLOROPROPANOIC ACID	1	0	0 00		
2	2 4 5 TRICHLOROPHENOXYACETIC	1	0	0 00		
3	2 4 DB	1	0	0 00		
4	2 4 DICHLOROPHENOXYACETIC AC	1	0	0 00		
5	4 4 DDD	82	0	0 10		
6	4 4 DDE	82	0	0 10		
7	4 4 DDT	82	0	0 10		
8	ALDRIN	82	0	0 05		
9	AMETRYN	5	0	0 00		
10	AROCLOR 1016	82	0	0 50		
11	AROCLOR 1221	82	0	0 50		
12	AROCLOR 1232	82	0	0 50		
13	AROCLOR 1242	82	0	0 50		
14	AROCLOR 1248	82	0	0 50		
15	AROCLOR 1254	82	1	1 00	0 15J	
16	AROCLOR 1260	82	0	1 00		
17	ATRAZINE	6	6	0 00	2 8	1 955
18	CHLORDANE	10	0	0 50		
19	CYANAZINE	5	0	0 00		
20	DICAMBA	1	0	0 00		
21	DICHLOROPROP	1	0	0 00		
22	DIELDRIN	82	0	0 10		
23	ENDOSULFAN I	82	0	0 05		
24	ENDOSULFAN II	82	0	0 10		
25	ENDOSULFAN SULFATE	82	0	0 10		
26	ENDRIN	82	0	0 10		
27	ENDRIN ALDEHYDE	2	0	0 00		
28	ENDRIN KETONE	79	0	0 10		
29	HEPTACHLOR	82	0	0 05		
30	HEPTACHLOR EPOXIDE	82	0	0 05		
31	HEXAVALENT CHROMIUM	24	0	0 00		
32	MCPA	1	0	0 00		
33	MCPP	1	0	0 00		
34	METHOXYCHLOR	79	0	0 50		
35	PHENOL 2 (1 METHYLPROPYL) 4	1	0	0 00		
36	PROMETON	5	0	0 00		
37	PROMETRYN	5	0	0 00		
38	PROPANOIC ACID 2 (2 4 5 TRI	1	0	0 00		
39	PROPAZINE	5	0	0 00		
40	SIMAZINE	5	3	0 00	0 81	0 757
41	SIMETRYN	5	0	0 00		
42	TERBUTHYLAZINE	5	0	0 00		
43	TOXAPHENE	82	0	1 00		
44	alpha BHC	82	0	0 05		
45	alpha CHLORDANE	72	0	0 50		
46	beta BHC	82	0	0 05		
47	delta BHC	82	0	0 05		
48	gamma BHC (LINDANE)	82	0	0 05		
49	gamma CHLORDANE	72	0	0 50		
		2 280	10			

Contact Required Quantitation Limit
Some herbicides are also shown in this lasting

TABLE 23

OU2 ALLUVIAL GROUND WATER PESTICIDE/PCB SUMMARY (µg/ℓ)

OBS	ANALYTE	Total Samples	Total Detections	CRQL*	Maximum Value	Average Value
1	4 4 DDD	9	0	0 10		
2	4 4 DDE	9	0	0 10		
3	4 4 DDT	9	0	0 10		
4	ALDRIN	9	0	0 05		
5	AROCLOR 1016	9	0	0 50		
6	AROCLOR 1221	9	0	0 50		
7	AROCLOR 1232	9	0	0 50		
8	AROCLOR 1242	9	0	0 50		
9	AROCLOR 1248	9	0	0 50		
10	AROCLOR 1254	9	0	1 00		
11	AROCLOR 1260	9	0	1 00		
12	CHLORDANE	9	0	0 50		
13	DIELDRIN	9	0	0 10		
14	ENDOSULFAN I	9	0	0 05		
15	ENDOSULFAN II	9	0	0 10		
16	ENDOSULFAN SULFATE	9	0	0 10		
17	ENDRIN	9	0	0 10		
18	ENDRIN KETONE	9	0	0 10		
19	HEPTACHLOR	9	0	0 05		
20	HEPTACHLOR EPOXIDE	9	0	0 05		
21	HEXAVALENT CHROMIUM	8	0	0 00		
22	METHOXYCHLOR	9	0	0 50		
23	TOXAPHENE	9	0	1 00		
24	alpha BHC	9	0	0 05		
25	beta BHC	9	0	0 05		
26	delta BHC	9	0	0 05		
27	gamma BHC (LINDANE)	9	0	0 05		
		242	0			

Contract Required Quantitation Limit

TABLE 24

OU2 BEDROCK GROUND WATER PESTICIDE/PCB SUMMARY ($\mu g/\ell$)

OBS	ANALYTE	Total Samples	Total Detections	CRQL	Maximum Value	Average Value
1	4 4 DDD	2	0	0 10		
2	4 4 DDE	2	0	0 10		
3	4 4 DDT	2	0	0 10		
4	ALDRIN	2	0	0 05		
5	AROCLOR 1016	2	0	0 50		
6	AROCLOR 1221	2	0	0 50		
7	AROCLOR 1232	2	0	0 50		
8	AROCLOR 1242	2	0	0 50		
9	AROCLOR 1248	2	0	0 50		
10	AROCLOR 1254	2	0	1 00		
11	AROCLOR 1260	2	0	1 00		
12	CHLORDANE	2	0	0 50		
13	DIELDRIN	2	0	0 10		
14	ENDOSULFAN I	2	0	0 05		
15	ENDOSULFAN II	2	0	0 10		
16	ENDOSULFAN SULFATE	2	0	0 10		
17	ENDRIN	2	0	0 10		
18	ENDRIN KETONE	2	0	0 10		
19	HEPTACHLOR	2	0	0 05		
20	HEPTACHLOR EPOXIDE	2	0	0 05		
21	HEXAVALENT CHROMIUM	2	0	0 00		
22	METHOXYCHLOR	2	0	0 50		
23	TOXAPHENE	2	0	1 00		
24	alpha BHC	2	0	0 05		
25	beta BHC	2	0	0 05		
26	delta BHC	2	0	0 05		
27	gamma BHC (LINDANE)	2	0	0 05		
		54	0			

Contact Required Quantitation Limit

TABLE 25

OU2 SURFACE WATER PESTICIDE/PCB SUMMARY BY LOCATION

Location	Sample Number	Analyte	Concentration (µg/ℓ)	Qualifier	Detection Limit	Collection Date
SW052	TRG SW00082WC	ATRAZINE*	0 72		0 05	90 06 18
SW026	TRG SW026004	ATRAZINE	2 70		0 50	89 10 06
SW026	TRG SW026005	ATRAZINE	2 50		0 50	89 10 17
SW026	TRG SW026004	SIMAZINE	0 78		0 60	89 10 06
SWC2	TRG SW207COMP013	ATRAZINE	2 70		0 50	89 10 11
SWC2	TRG SW207COMP014	ATRAZINE	2 80		0 50	89 10 17
SWC2	TRG NP50306WC	ATRAZINE	0 31		0 15	91 03 18
SWC2	TRG SW207COMP013	SIMAZINE	0 81		0 60	89 10 11
SWC2	TRG SW207COMP014	ATRAZINE	0 68		0 60	89 10 17
SW060	TRG SW00440WC	AROCLOR 1254	0 15	J		90 10 16

Atrazine and Simazine are herbicides   Pesticides were not detected

TABLE 26

OU2 SOIL VOC SUMMARY (μg/kg)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL*	Maximum Value	Average Value
1	1 1 1 TRICHLOROETHANE	188	18	5	190	59 06
2	1 1 2 2 TETRACHLOROETHANE	188	0	5		
3	1 1 2 TRICHLOROETHANE	188	3	5	27	13 67
4	1 1 DICHLOROETHANE	188	0	5		
5	1 1 DICHLOROETHENE	188	1	5	8 J	8 00
6	1 2 DICHLOROETHANE	187	51	5	120	25 08
7	1 2 DICHLOROPROPANE	188	0	5		
8	2 BUTANONE	188	23	10	210 J	73 61
9	2 CHLOROETHYL VINYL ETHER	188	1	0	31 J	31 00
10	2 HEXANONE	188	0	10		
11	4 METHYL 2 PENTANONE	188	1	10	120 J	120 00
12	ACETONE	188	171	10	2400 B	276 75
13	BENZENE	188	1	5	12 J	12 00
14	BROMODICHLOROMETHANE	188	0	5		
15	BROMOFORM	188	0	5		
16	BROMOMETHANE	188	1	10	6 J	6 00
17	CARBON DISULFIDE	188	2	5	140 B	99 00
18	CARBON TETRACHLORIDE	188	2	5	100	64 50
19	CHLOROBENZENE	188	0	5		
20	CHLOROETHANE	188	1	10	50 J	50 00
21	CHLOROFORM	188	4	5	130 J	39 75
22	CHLOROMETHANE	188	0	10		
23	DIBROMOCHLOROMETHANE	188	0	5		
24	ETHYLBENZENE	188	3	5	780	360 33
25	METHYLENE CHLORIDE	188	113	5	210 B	14 72
26	STYRENE	188	1	5	17 J	17 00
27	TETRACHLOROETHENE	188	13	5	10000	1115 39
28	TOLUENE	188	10	5	640	106 80
29	TOTAL XYLENES	188	5	5	3300	771 60
30	TRICHLOROETHENE	188	17	5	16000	1389 41
31	VINYL ACETATE	188	0	10		
32	VINYL CHLORIDE	188	0	10		
33	cis 1 3 DICHLOROPROPENE	188	2	5	6 J	6 00
34	trans 1 2 DICHLOROETHENE	188	2	5	10 J	9 00
35	trans 1 3 DICHLOROPROPENE	188	0	5		
		= =	-==			
		6579	446			

Contract Required Quantitation Limit

J Estimated value below the detection limit

B Found in laboratory blank

TABLE 27

OU2 SEDIMENT VOC SUMMARY (µg/kg)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL*	Maximum Value	Average Value
1	1 1 1 TRICHLOROETHANE	28	0	5		
2	1 1 2 2 TETRACHLOROETHANE	28	0	5		
3	1 1 2 TRICHLOROETHANE	28	0	5		
4	1 1 DICHLOROETHANE	28	0	5		
5	1 1 DICHLOROETHENE	28	1	5	5 J	5 000
6	1 2 DICHLOROETHANE	28	0	5		
7	1 2 DICHLOROETHENE	24	0	5		
8	1 2 DICHLOROPROPANE	28	0	5		
9	2 BUTANONE	28	3	10	100	42 667
10	2 CHLOROETHYL VINYL ETHER	3	0	0		
11	2 HEXANONE	28	0	10		
12	4 METHYL 2 PENTANONE	28	0	10		
13	ACETONE	28	18	10	480 B	92 389
14	BENZENE	28	1	5	3 J	3 000
15	BROMODICHLOROMETHANE	28	0	5		
16	BROMOFORM	28	0	5		
17	BROMOMETHANE	28	0	10		
18	CARBON DISULFIDE	28	1	5	6 J	6 000
19	CARBON TETRACHLORIDE	28	0	5		
20	CHLOROBENZENE	28	1	5	4 J	4 000
21	CHLOROETHANE	28	0	10		
22	CHLOROFORM	28	1	5	18	18 000
23	CHLOROMETHANE	28	2	10	60	39 500
24	DIBROMOCHLOROMETHANE	28	0	5		
25	ETHYLBENZENE	28	2	5	4 J	2 500
26	METHYLENE CHLORIDE	28	20	5	54 B	12 400
27	STYRENE	28	0	5		
28	TETRACHLOROETHENE	28	0	5		
29	TOLUENE	28	8	5	59	9 750
30	TOTAL XYLENES	28	1	5	7 J	7 000
31	TRICHLOROETHENE	28	5	5	8	5 400
32	VINYL ACETATE	28	0	10		
33	VINYL CHLORIDE	28	0	10		
34	cis 1 3 DICHLOROPROPENE	28	0	5		
35	trans 1 2 DICHLOROETHENE	4	0	5		
36	trans 1 3 DICHLOROPROPENE	28	0	5		
		== -=	-== =			
		955	64			

Contract Required Quantitation Limit

J Estimated value below the detection limit

B Found in laboratory blank

TABLE 28

OU2 SOIL ACID EXTRACTABLE SUMMARY ($\mu g/kg$)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL*	Maximum Value	Average Value
1	2 4 5 TRICHLOROPHENOL	183	0	1600		
2	2 4 6 TRICHLOROPHENOL	183	0	330		
3	2 4 DICHLOROPHENOL	183	0	330		
4	2 4 DIMETHYLPHENOL	183	0	330		
5	2 4 DINITROPHENOL	183	0	1600		
6	2 CHLOROPHENOL	183	0	330		
7	2 METHYLPHENOL	183	0	330		
8	2 NITROPHENOL	183	0	330		
9	4 6 DINITRO 2 METHYLPHENOL	183	0	1600		
10	4 CHLORO 3 METHYLPHENOL	183	0	330		
11	4 METHYLPHENOL	183	0	330		
12	4 NITROPHENOL	183	0	1600		
13	BENZOIC ACID	183	0	1600		
14	BENZYL ALCOHOL	183	0	330		
15	PENTACHLOROPHENOL	183	2	1600	95 J	68
16	PHENOL	183	0	330		
		=====	=====			
		2928	2			

* Contract Required Quantitation Limit

J Estimated value below the detection limit

TABLE 29

OU2 SEDIMENT ACID EXTRACTABLE SUMMARY (μg/kg)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL	Maximum Value	Average Value
1	2 4 5 TRICHLOROPHENOL	15	0	1600		
2	2 4 6 TRICHLOROPHENOL	15	0	330		
3	2 4 DICHLOROPHENOL	15	0	330		
4	2 4 DIMETHYLPHENOL	15	0	330		
5	2 4 DINITROPHENOL	15	0	1600		
6	2 CHLOROPHENOL	15	0	330		
7	2 METHYLPHENOL	15	0	330		
8	2 NITROPHENOL	15	0	330		
9	4 6 DINITRO 2 METHYLPHENOL	15	0	1600		
10	4 CHLORO 3 METHYLPHENOL	15	0	330		
11	4 METHYLPHENOL	15	0	330		
12	4 NITROPHENOL	15	0	1600		
13	BENZOIC ACID	15	0	1600		
14	BENZYL ALCOHOL	15	0	330		
15	PENTACHLOROPHENOL	15	0	1600		
16	PHENOL	15	1	330	650 J	650
			==			
		240	1			

Contract Required Quantitation Limit

J Estimated value below the detection limit

TABLE 30

OU2 SOIL AND SEDIMENT ACID EXTRACTABLE SUMMARY BY LOCATION

Location	Sample Number	Analyte	Concentration (µg/kg)	Qualifier	Detection Limit	Collection Date
BH4787	BH478726CT	PENTACHLOROPHENOL	95 00	J		15 SEP 87
BH5487	BH548702WT	PENTACHLOROPHENOL	41 00	J		15 SEP 87
SED030	SS00121WC	PHENOL	650	J	330	22 AUG 90

J Estimated value below the detection limit

TABLE 31

SOURCE CHARACTERIZATION BOREHOLES FOR IHSSs IN OU2 NOT PREVIOUSLY DRILLED

IHSS	Boreholes
903 Drum Storage Site (IHSS Ref No 112)	BH0191 through BH1391
Gas Detoxification Site (IHSS Ref No 183)	BH4691
Pallet Burn Site (IHSS Ref No 154)	BH2891
Trenches T-3 through T 11 (IHSS Ref Nos 110 111 1 through 111 8)	BH2991 through BH4191
East Spray Field (IHSS Ref Nos 216 2 and 216 3)	BH4291 through BH4591

TABLE 32

OU2 SOIL BASE NEUTRAL EXTRACTABLE SUMMARY (µg/kg)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL*	Maximum Value	Average Value
1	1 2 4 TRICHLOROBENZENE	183	0	330		
2	1 2 DICHLOROBENZENE	183	0	330		
3	1 3 DICHLOROBENZENE	183	0	330		
4	1 4 DICHLOROBENZENE	183	0	330		
5	2 4 DINITROTOLUENE	183	0	330		
6	2 6 DINITROTOLUENE	183	0	330		
7	2 CHLORONAPHTHALENE	183	0	330		
8	2 METHYLNAPHTHALENE	183	0	330		
9	2 NITROANILINE	183	0	1600		
10	3 3 DICHLOROBENZIDINE	183	0	660		
11	3 NITROANILINE	183	0	1600		
12	4 BROMOPHENYL PHENYL ETHER	183	0	330		
13	4 CHLOROANILINE	183	0	330		
14	4 CHLOROPHENYL PHENYL ETHER	183	0	330		
15	4 NITROANILINE	183	0	1600		
16	ACENAPHTHENE	183	0	330		
17	ACENAPHTHYLENE	183	0	330		
18	ANTHRACENE	183	0	330		
19	BENZO(a)ANTHRACENE	183	0	330		
20	BENZO(a)PYRENE	183	0	330		
21	BENZO(b)FLUORANTHENE	183	0	330		
22	BENZO(ghi)PERYLENE	183	0	330		
23	BENZO(k)FLUORANTHENE	183	0	330		
24	BIS(2 CHLOROETHOXY)METHANE	183	0	330		
25	BIS(2 CHLOROETHYL)ETHER	183	0	330		
26	BIS(2 CHLOROISOPROPYL)ETHER	183	0	330		
27	BIS(2 ETHYLHEXYL)PHTHALATE	183	180	330	18000 B	924 717
28	BUTYL BENZYL PHTHALATE	183	1	330	69 J	69 000
29	CHRYSENE	183	0	330		
30	DI n BUTYL PHTHALATE	183	80	330	3400	111 425
31	DI n OCTYL PHTHALATE	183	3	330	160 J	97 000
32	DIBENZO(a h)ANTHRACENE	183	0	330		
33	DIBENZOFURAN	183	0	330		
34	DIETHYL PHTHALATE	183	0	330		
35	DIMETHYL PHTHALATE	183	0	330		
36	FLUORANTHENE	183	2	330	110 J	73 500
37	FLUORENE	183	0	330		
38	HEXACHLOROBENZENE	183	0	330		
39	HEXACHLOROBUTADIENE	183	0	330		
40	HEXACHLOROCYCLOPENTADIENE	183	0	330		
41	HEXACHLOROETHANE	183	0	330		
42	INDENO(1 2 3 cd)PYRENE	183	0	330		
43	ISOPHORONE	183	0	330		
44	N NITROSO DI n PROPYLAMINE	183	0	330		
45	N NITROSODIPHENYLAMINE	183	48	330	370 B	79 167
46	NAPHTHALENE	183	0	330		
47	NITROBENZENE	183	0	330		
48	PHENANTHRENE	183	0	330		
49	PYRENE	183	0	330		
		8967	314			

Contract Required Quantitation Limit
J Estimated value below the detection limit
B Found in laboratory blank

TABLE 33

OU2 SEDIMENT BASE NEUTRAL EXTRACTABLE SUMMARY (μg/kg)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL*	Maximum Value	Average Value
1	1 2 4 TRICHLOROBENZENE	15	0	330		
2	1 2 DICHLOROBENZENE	15	0	330		
3	1 3 DICHLOROBENZENE	15	0	330		
4	1 4 DICHLOROBENZENE	15	0	330		
5	2 4 DINITROTOLUENE	15	0	330		
6	2 6 DINITROTOLUENE	15	0	330		
7	2 CHLORONAPHTHALENE	15	0	330		
8	2 METHYLNAPHTHALENE	15	0	330		
9	2 NITROANILINE	15	0	1600		
10	3 3 DICHLOROBENZIDINE	15	0	660		
11	3 NITROANILINE	15	0	1600		
12	4 BROMOPHENYL PHENYL ETHER	15	0	330		
13	4 CHLOROANILINE	15	0	330		
14	4 CHLOROPHENYL PHENYL ETHER	15	0	330		
15	4 NITROANILINE	15	0	1600		
16	ACENAPHTHENE	15	0	330		
17	ACENAPHTHYLENE	15	0	330		
18	ANTHRACENE	15	0	330		
19	BENZO(a)ANTHRACENE	15	0	330		
20	BENZO(a)PYRENE	14	0	330		
21	BENZO(b)FLUORANTHENE	14	0	330		
22	BENZO(ghi)PERYLENE	14	0	330		
23	BENZO(k)FLUORANTHENE	14	0	330		
24	BIS(2 CHLOROETHOXY)METHANE	15	0	330		
25	BIS(2 CHLOROETHYL)ETHER	15	0	330		
26	BIS(2 CHLOROISOPROPYL)ETHER	15	0	330		
27	BIS(2 ETHYLHEXYL)PHTHALATE	14	9	330	1300 BJ	390 0
28	BUTYL BENZYL PHTHALATE	15	0	330		
29	CHRYSENE	15	0	330		
30	DI n BUTYL PHTHALATE	15	8	330	400 BJ	172 5
31	DI n OCTYL PHTHALATE	14	0	330		
32	DIBENZO(a h)ANTHRACENE	14	0	330		
33	DIBENZOFURAN	15	0	330		
34	DIETHYL PHTHALATE	15	0	330		
35	DIMETHYL PHTHALATE	15	0	330		
36	FLUORANTHENE	15	1	330	50 J	50 0
37	FLUORENE	15	0	330		
38	HEXACHLOROBENZENE	15	0	330		
39	HEXACHLOROBUTADIENE	15	0	330		
40	HEXACHLOROCYCLOPENTADIENE	15	0	330		
41	HEXACHLOROETHANE	15	0	330		
42	INDENO(1 2 3 cd)PYRENE	14	0	330		
43	ISOPHORONE	15	0	330		
44	N NITROSO DI n PROPYLAMINE	15	0	330		
45	N NITROSODIPHENYLAMINE	15	3	330	370 JB	260 0
46	NAPHTHALENE	15	0	330		
47	NITROBENZENE	15	0	330		
48	PHENANTHRENE	15	0	330		
49	PYRENE	15	1	330	50 J	50 0
		727	22			

Contract Required Quantitation Limit
J Estimated value below the detection limit
B Found in laboratory blank

TABLE 34

OU2 SOIL/SEDIMENT PNA SUMMARY BY LOCATION

Location	Sample Number	Analyte	Concentration ($\mu g/\ell$)	Qualifier	Detection Limit	Collection Date
BH3687	TRG BH36870005	FLUORANTHENE	37 00	J		
BH3787	TRG BH37870005	FLUORANTHENE	110 00	J	330	
SED012	TRG SED1208860	PYRENE	50 00	J	270	
SED012	TRG SED1208860	FLUORANTHENE	50 00	J	270	

J Estimated value below the detection limit

TABLE 35

OU2 SOIL PESTICIDES/PCBs SUMMARY ($\mu g/kg$)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL*	Maximum Value	Average Value
1	4 4 DDD	185	0	16		
2	4 4 DDE	185	0	16		
3	4 4 DDT	185	0	16		
4	ALDRIN	185	0	8		
5	AROCLOR 1016	185	0	80		
6	AROCLOR 1221	185	0	80		
7	AROCLOR 1232	185	0	80		
8	AROCLOR 1242	185	0	80		
9	AROCLOR 1248	185	0	80		
10	AROCLOR 1254	185	1	80	21 J	21
11	AROCLOR 1260	185	0	80		
12	CHLORDANE	185	0	80		
13	DIELDRIN	185	0	16		
14	ENDOSULFAN I	185	0	8		
15	ENDOSULFAN II	185	0	16		
16	ENDOSULFAN SULFATE	185	0	16		
17	ENDRIN	185	0	16		
18	ENDRIN KETONE	185	0	16		
19	HEPTACHLOR	185	0	8		
20	HEPTACHLOR EPOXIDE	185	0	8		
21	METHOXYCHLOR	185	0	80		
22	TOXAPHENE	185	0	160		
23	alpha BHC	185	0	8		
24	beta BHC	185	0	8		
25	delta BHC	185	0	8		
26	gamma BHC (LINDANE)	185	0	8		
			===-			
		4810	1			

Contract Required Quantitation Limit

J Estimated value below the detection limit

TABLE 36

OU2 SEDIMENT PESTICIDES/PCBs SUMMARY (µg/kg)

OBS	ANALYTE	Total Analysis	Total Detections	CRQL	Maximum Value	Average Value
1	4 4 DDD	18	0	16		
2	4 4 DDE	18	0	16		
3	4 4 DDT	18	1	16	95 XZ	95
4	ALDRIN	18	0	8		
5	AROCLOR 1016	18	0	80		
6	AROCLOR 1221	18	0	80		
7	AROCLOR 1232	18	0	80		
8	AROCLOR 1242	18	0	80		
9	AROCLOR 1248	18	0	80		
10	AROCLOR 1254	18	1	80	540 X	540
11	AROCLOR 1260	18	0	80		
12	CHLORDANE	3	0	80		
13	DIELDRIN	18	0	16		
14	ENDOSULFAN I	18	0	8		
15	ENDOSULFAN II	18	0	16		
16	ENDOSULFAN SULFATE	18	0	16		
17	ENDRIN	18	0	16		
18	ENDRIN KETONE	18	0	16		
19	HEPTACHLOR	18	0	8		
20	HEPTACHLOR EPOXIDE	18	0	8		
21	METHOXYCHLOR	18	0	80		
22	TOXAPHENE	18	0	160		
23	alpha BHC	18	0	8		
24	alpha CHLORDANE	15	0	80		
25	beta BHC	18	0	8		
26	delta BHC	18	0	8		
27	gamma BHC (LINDANE)	18	0	8		
28	gamma CHLORDANE	15	0	80		
		=				
		483	2			

Contract Required Quantitation Limit

X More than five qualifiers other specific flags may be required to properly define the result

Z More than five qualifiers other specific flags may be required to properly define the result

TABLE 37

OU2 SOIL/SEDIMENT PESTICIDE/PCB SUMMARY BY LOCATION

Location	Sample Number	Analyte	Concentration (µg/kg)	Qualifier	Detection Limit	Collection Date
BH3687	TRG BH36870005	AROCLOR 1254	21 00	J		
SED011	TRG SS00140WC	4 4 DDT	95	XZ		90 12 03
SED011	TRG SS00140WC	AROCLOR 1254	540	X		90 12 03

J Estimated value below the detection limit

X More than five qualifiers other specific flags may be required to properly define the result

Z More than five qualifiers other specific flags may be required to properly define the result

TABLE 38

SITE-SPECIFIC CHEMICAL ANALYSIS ROSTER

MATRIX	ANALYTICAL SUITES			
	Volatile Organics	Acid Extractables	Base Neutral Extractables	Pesticides/ PCBs
Waste Sources	Yes [1]	Yes [2]	Yes [2]	Yes [2]
Sediments	Yes [1]	No [4]	No [4]	No [4]
Ground Water	Yes [1]	Yes [3]	Yes [3]	Yes [3]
Surface Water	Yes [1]	No [4]	No [4]	No [4]

Notes

Case Determination

[1] Case III supplemental data required

[2] Case II supplemental data required

[3] Case II supplemental data required only for source characterization alluvial monitor wells

[4] Case II supplemental data not required

TABLE 39

GROUND WATER VOLATILE ORGANIC ANALYSIS METHOD SPECIFICATION

CLP Method	EPA Method 502 2
Ground Water Monitoring Wells	All 1991 Ground Water Monitoring Wells*
3386	3986
4186	5087
4286	6386
4286	6786
4386	2987
1087	4487
1587	3686
1787	3786
1987	6486
2487	6586
2687	6686
2787	0386
3287	0286
3387	6286
3587	3087BR
2187	4587BR
0171	
0271	
0174	
0374	
0987BR	
1187BR	
1287BR	
1487BR	
2387BR	
2587BR	
3687BR	
3486	
4086	
1687BR	
18887BR	
2087BR	
2287BR	
2887BR	
3187BR	
3487BR	

* Except source characterization alluvial monitor wells which will be analyzed for all TCL organics using the CLP methods

REFERENCES

EPA 1988 Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA OSWER Directive 9355 3 —01

EPA 1989 Data Quality Objectives for Remedial Response Activities OSWER Directive 9355 0 7B

TABLE 8
SUMMARY OF NON VOLATILE ORGANIC COMPOUND OCCURRENCES IN GROUND WATER AND SURFACE WATER BY IHSS

IHSS Name (IHSS Number [No])	Monitoring Wells Immediately Downgradient of IHSSs	Surface Water Stations Immediately Downgradient of IHSSs	Acid Extractables (µg/ℓ)			Base Neutral Extractables (µg/ℓ)			Pesticides/PCBs (µg/ℓ)			Remarks
			Compound	Detection per Samples Analyzed	Minimum Concentration Maximum Concentration	Compound	Detection per Samples Analyzed	Minimum Concentration Maximum Concentration	Compound	Detection per Samples Analyzed	Minimum Concentration Maximum Concentration	
Trench T 1 (IHSS No 108) Mound Site (IHSS No 113)	19-87 20-87 01 74 34-86 35-86	SW 59		(0/7)			(0/7)			(0/7)		Non volatiles were not detected downgradient of these IHSSs
Trench T 2 (IHSS No 109) Reactive Metal Destruct on Site (IHSS No 140) Gas Detoxification Site (IHSS No 183) 903 Lip Site (IHSS No 155)	02 71 62 86 63 86 12 87 11 87 1 71 15-87 16-87 17 87 18-87 43-86 23-87	SW 30 SW 50 SW 51 SW 52 SW 55 SW 57 SW 58 SW 77		(0/4)			(0/4)		Atrazine	(1/24)	0 720	Except for atrazine at SW 52 non volatiles were not detected downgradient of these IHSSs Atrazine is probably from weed control and not from these IHSSs It is also below health-based reference concentrat on
Trench T 3 (IHSS No 110) Trench T-4 (IHSS No 111 1) Trench T 10 (IHSS No 111 7) Trench T 11 (IHSS No 111 8)	03-74 35-87 36-87	NA		(0/1)			(0/1)			(0/1)		Non-volatiles were not detected downgradient of these IHSSs
Trenches T 5 through T 9 (IHSS Nos 111 2 through 111 6)	27-87 28 87 07 74 31 87	SW-65 SW 27	2 Methyl phenol Benzoic Ac d Phenol	(1/7) (1/7) (1/7)	24 8J 13		(0/7)			(0/7)		Acid Extractables were detected only once in four sampling rounds Other IHSSs could be source and data could be spurious Phenol significantly below health based reference concentration Although downgrad ent wells were not sampled for non-volatiles IHSSs are targeted for full suite analys s If significant non-volatile organics are detected at the waste sources downgradient wells and surface water stations will be sampled and analyzed for non volatiles
903 Pad Drum Storage S te (IHSS No 112)	43-86 23-87 16 87 15-87 1 71	SW 50		(0/1)			(0/1)			(0/9)		Non-volatiles were not detected downgradient of these IHSSs
Oil Burn P t No 2 (IHSS No 153) Pallet Burn Sites (IHSS No 154 1 and 154 2)	21-87 22 87	SW 59		(0/5)			(0/5)			(0/12)		Non volatiles were not detected downgradient of these IHSSs
East Spray F eld (IHSS No 216 2 and 216 3)	32-87 40-86 41 86	SW 26		(0/6)			(0/6)		Atrazine Simazine	(2/6) (1/6)	2 5 2 7 0 78	Altrazine and Simazine were present at low concentrations at SW 26 Source is likely from weed control and not from the IHSSs considering the contaminants and large drainage area abo e SW 26 Atraz ne was below health-based reference concentration

NOTES Analytes shown here do not include phthalate esters or N nitrosod phenylam neas as these compounds are suspected field or laboratory contam nants
** Analyzed for pesticides/PCBs only
Targeted for full suite ananlys s
J Estimated value
N/A Not Applicable

eg&g wp-adde \mis I p

TABLE 9

SUMMARY OF NON VOLAITE ORGANIC COMPOUND OCCURRENCES IN SOILS BY IHSS

IHSS Name and No	Boreholes Associated with IHSSs	Acid Extractables (µg/ℓ)			Base Neutral Extractables (µg/ℓ)			Pesticides/PCBs (µg/ℓ)			Remarks
		C mp d	Detect p Sampl A aly ed	Mi mum Con en on M x mum C t	Compound	Detect per Sampl Analyzed	Mi imum Con ent at Ma mum C n t	Compou d	Detection per Samples Analyzed	Minimum Concentration Maximum Concentrat n	
903 Drum Storage S te (IHSS No 112) 903 Pad Lip Site (IHSS No 155)	BH22-87 BH23-87 BH24-87 BH29-87 BH30-87		(0/23)			(0/23)			(0/23)		Non-volatiles were not present in soils in the vicinity of these IHSSs
Mound Site (IHSS No 113) Trench T 1 (IHSS No 108)	BH35-87 BH36-87 BH37-87 BH38-87		(0/15)		Fluoranthene	(2/15)	37J 110J	AROCLOR-1254	(1/15)	21J	Fluoranthene occurred in the surface composites and is unlikely to be associated with buried waste at these IHSSs (see text) AROCHLOR-1254 is randomly found in soils at OU2 Concentration observed here is below health-based reference concentration
Pallet Burn Site (IHSS No 154) Oil Burn Pits (IHSS No 153)	BH31-87 BH32-87 BH33-87 BH34-87		(0/18)			(0/18)			(0/18)		Non-volatiles were not present in soils in the vicinity of these IHSSs
Trench T 3 (IHSS No 110) Trench T 4 (IHSS No 111 1) Trench T 10 (IHSS No 111 7) Trench T 11 (IHSS No 111 8)	BH39-87 through BH46-87		(0/50)			(0/50)			(0/50)		Non-volatiles were not present in the vic nity of these IHSSs
Trenches T 5 through T 9 (IHSS 111 2 thro gh 111 6)	BH47 87 through BH57-87	Pentachloro phenol	(2/80)	41J 95J		(0/80)			(0/80)		Pentachlorphenol rarely occurred n soils at OU2 Concentrations observed here are well below health-based reference concentration IHSS will ne ertheless be sampled for acid extractables
East Spring Irrigat on Sites (IHSSs 216 2 and 216 3)	No boreholes associated with IHSS		(0/0)			(0/0)			(0/0)		IHSSs will be sampled and analyzed for all TCL organics

Note Analytes shown here do not nclude phthalate esters or N nitrosodiphenylamine as these compounds are suspected field or laboratory contamiants
J Estimated value below detection limit
Targeted for full suite analysis

eg&g\wp- de \misctbls p

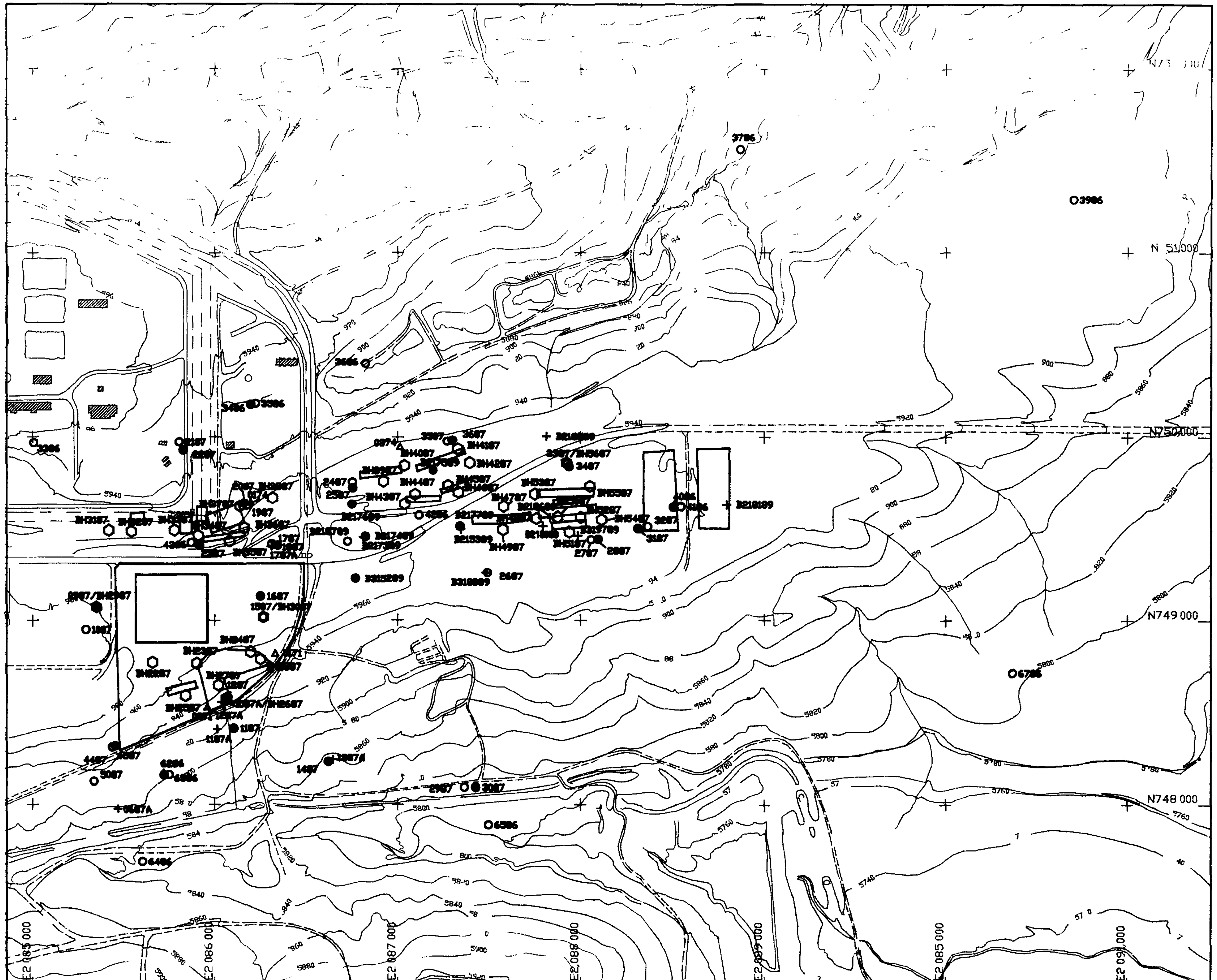
TABLE 10

SUMMARY OF NON VOLATILE ORGANIC COMPOUND OCCURRENCES IN SEDIMENTS BY IHSS

IHSS Name and No	Sediment Station Downgradient of IHSSs	Acid Extractables (µg/kg)			Base Neutral Extractables (µg/kg)			Pesticides/PCBs (µg/kg)			Remarks
		C mpou d	D p Sampl A alyzed	Mi mum Con en t Max mum Con en	Compou d	Detecti per Sampl Analyzed	Minimum Con entr t Maximum Con en t	C mpou d	Detection per Samples A alyzed	Minimum Concentration Maximum Concentration	
Trench T 1 (IHSS No 108) Mound Site (IHSS No 113) Oil Burn Pit No 2 (IHSS No 153) Pallet Burn Site (IHSSs Nos 154 1 and 154 2)	NA		NA			NA			NA		No downgradient stations exist
Trench T 2 (IHSS No 109) 903 Drum Storage S te (IHSS No 112) 903 Lip S te (IHSS No 155) Reactive Metal Destruction Site (IHSS No 140) Gas Detoxif cation Site (IHSS No 183)	SED-28 SED 29		(0/3)			(0/3)			(0/3)		Non-volatile organics were not detected downgradient of these IHSSs
Trenches T 5 through T 9 (IHSS Nos 111 2 thro gh 111 6)	SED-25		(0/2)			(0/2)			(0/2)		Non volatile organics were not detected downgrad ent of these IHSSs
Trench T 3 (IHSS 110) Trench T-4 (IHSS 111 1) Trench T 10 (IHSS 111 7) Trench T 11 (IHSS 111 8)	NA		(0/0)			(0/0)			(0/0)		No downgradient stations exist
East Spary Field (IHSS Nos 216 2 216 3)	SED-24		(0/0)			(0/0)			(0/0)		Downgradient station was not sampled and analyzed for non-volatiles

Note Analytes shown here do not include phthalate esters or N-nitrodiphenylam ne as these compounds are suspected f eld or laboratory contaminants
NA Not applicable
Analyzed for acid extractables base neutral extractables and pest c des/PCBs
Targeted for full su te analys s

eg&g\wp-adden m sctbl p



EXPLANATION

INDIVIDUAL HAZARDOUS SUBSTANCE SITE AND IHSS DESIGNATION

B217489	●	BEDROCK MONITOR WELL
B213789	○	ALLUVIAL MONITOR WELL
0392	△	PRE-1986 MONITOR WELL
B217389	+	ABANDONED HOLE
BH4987	⬡	BOREHOLE

Scale 1 = 600

0' 300' 600'

CONTOUR INTERVAL = 20'

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant Golden Colorado

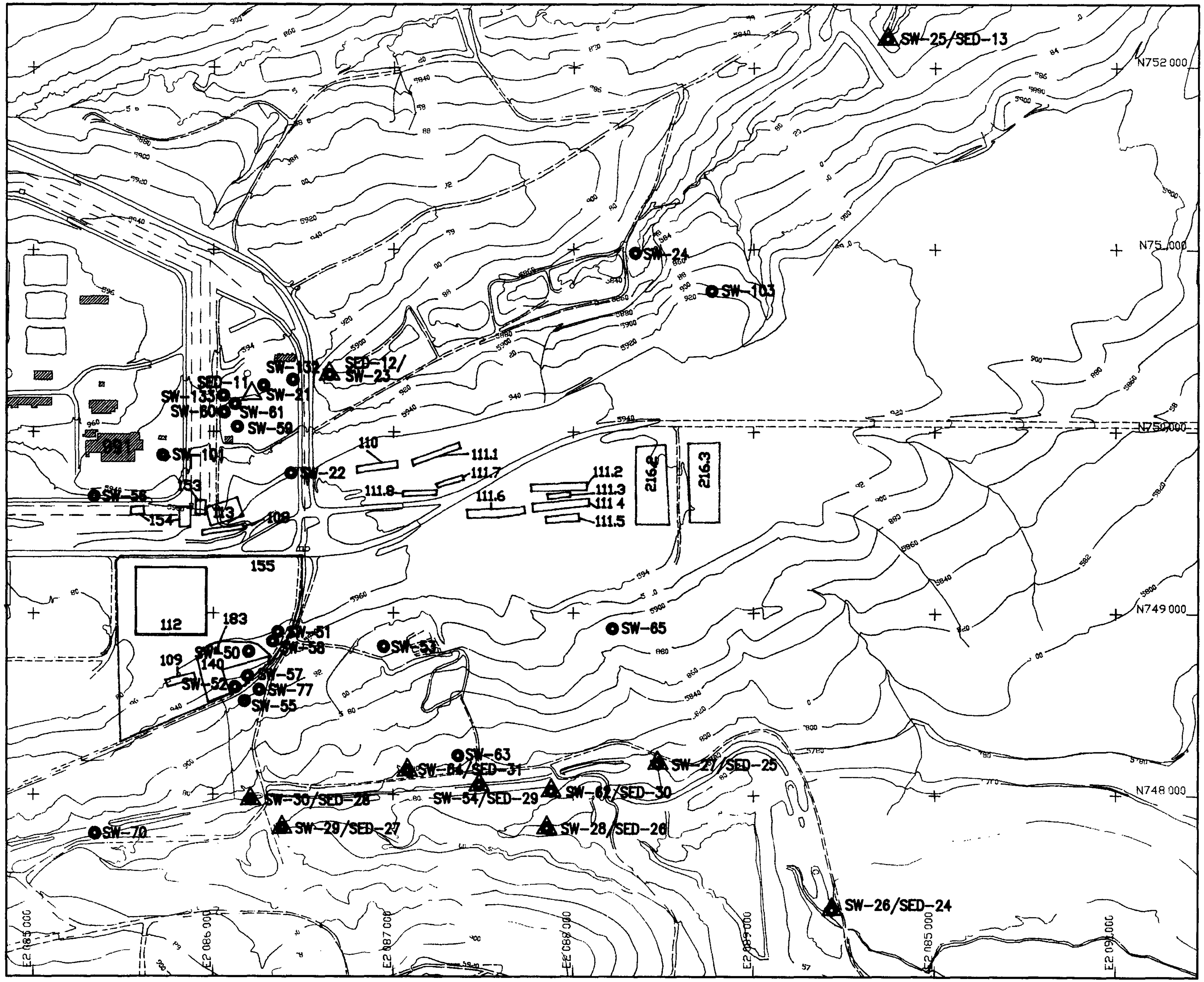
OPERABLE UNIT NO 2
PHASE II RFI/RI WORK PLAN (ALLUVIAL)

PHASE I REMEDIAL INVESTIGATION MONITOR WELL AND BOREHOLE LOCATIONS

FIGURE 1

July, 1991

R33N021/N8070281/600



EXPLANATION

SW-25 SURFACE WATER MONITORING STATION

SED-11 SEDIMENT SAMPLING STATION

ANALYZE FOR VOLATILES ONLY (CLP METHOD)

ANALYZE FOR VOLATILES ONLY (METHOD-EPA 502.2)

216.2 INDIVIDUAL HAZARDOUS SUBSTANCE SITE AND IHSS DESIGNATION

N

Scale 1 = 600

0' 300' 600'

CONTOUR INTERVAL = 20'

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant Golden, Colorado

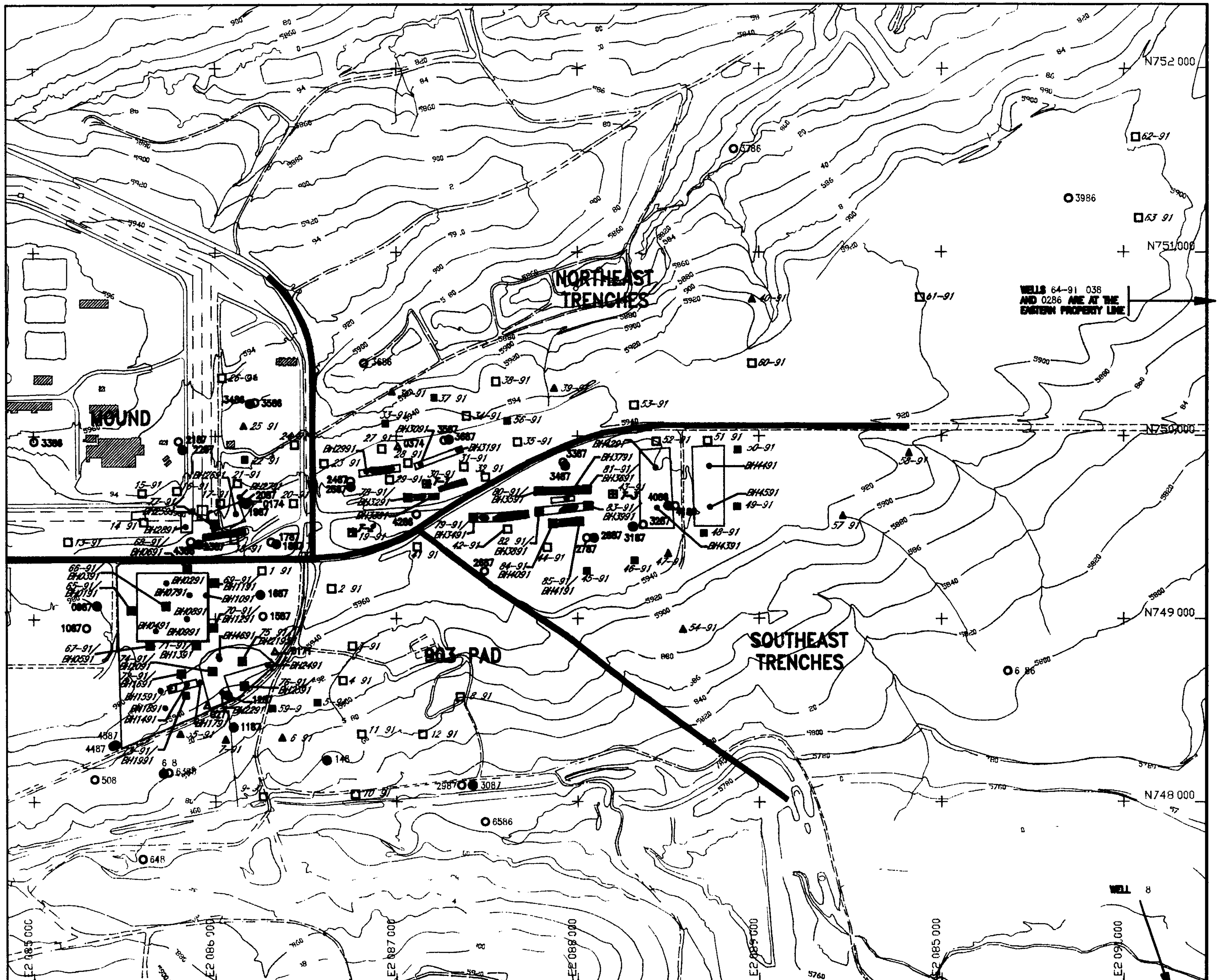
OPERABLE UNIT NO 2
PHASE II RFI/RI WORK PLAN (ALLUVIAL)

SURFACE WATER AND SEDIMENT MONITORING STATIONS

FIGURE 2

July, 1991

R33N020.MBCW-080491/800



EXPLANATION

- 4587 ● BEDROCK MONITOR WELL
- 4487 ○ ALLUVIAL MONITOR WELL
- 25-91/BH1791 ■ PROPOSED SOURCE CHARACTERIZATION ALLUVIAL MONITOR WELL AND BOREHOLE
- 8-91 □ PROPOSED PLUME CHARACTERIZATION ALLUVIAL MONITOR WELL
- BH1791 PROPOSED SOURCE CHARACTERIZATION BOREHOLE
- ■ 60-91 DRIVER WELL SITE – PROPOSED PLUME CHARACTERIZATION ALLUVIAL MONITOR WELL SITE
- ▲ 60-91 CONTINGENCY WELL SITE – PROPOSED PLUME CHARACTERIZATION ALLUVIAL MONITOR WELL SITE
- 7-2 + PROPOSED HYDRAULIC TEST LOCATION
- INDIVIDUAL HAZARDOUS SUBSTANCE SITE LOCATION
- LOCATION OF BARRELS DETERMINED BY VISUAL INSPECTION OR MAGNETOMETER SURVEY

TOTAL PROPOSED WELL SITES	85
TOTAL BOREHOLES	46
TOTAL WELL SITES	131

- ANALYZE FOR VOLATILES ONLY (CLP METHOD)
- ANALYZE FOR ALL TCL ORGANICS
- ANALYZE FOR VOLATILES ONLY (METHOD–EPA 502.2)

Scale 1 = 600

0' 300' 600'

CONTOUR INTERVAL = 20'

U.S. DEPARTMENT OF ENERGY
Rocky Flats Plant, Golden, Colorado

OPERABLE UNIT NO 2
PHASE II RFI/RI WORK PLAN (ALLUVIAL)

EXISTING AND PROPOSED PHASE II RFI/RI MONITOR WELL AND BOREHOLE LOCATIONS

FIGURE 3

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